

Presented By:

East Bay Municipal Utility District (Lead agency)

Alameda County Water District

Contra Costa Water District

City of Davis

Los Trancos County Water District

Santa Clara Valley Water District

Sonoma County Water Agency

To:

California Department of Water Resources

Office of Water Use Efficiency

1416 Ninth Street, Room 338

Sacramento, CA 95814

Attention: Marsha Prillwitz

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A-1 URBAN WATER CONSERVATION GRANT APPLICATION COVER SHEET

1. Applicant (Organization or affiliation):	<u>East Bay Municipal Utility District</u>	
2. Project Title:	<u>ET Controller Installation Project</u>	
3. Person authorized to sign and submit proposal:		
	Name, Title	<u>Dennis M. Diemer, General Manager</u>
	Mailing address	<u>P.O. Box 24055, Oakland, CA 94623-1055</u>
	Telephone	<u>(510) 287-0101</u>
	Fax	<u>(510) 287-0188</u>
	E-mail	<u>DennisD@ebmud.com</u>
4. Contact person (if different):		
	Name, Title	<u>Scott Sommerfeld, Water Conservation Representative</u>
	Mailing address	<u>P.O. Box 24055, MS #48</u> <u>Oakland, CA 94623-1055</u>
	Telephone	<u>(510) 287-0593</u>
	Fax	<u>(510) 287-1883</u>
	E-mail	<u>sommerf@ebmud.com</u>
5. Funds requested (dollar amount):	<u>\$2,285,238</u>	
6. Applicant funds pledged (local cost share) (dollar amount):	<u>\$1,186,029 (agency & customer contributions)</u>	
7. Total project costs (dollar amount):	<u>\$3,471,267</u>	
8. Estimated net water savings (acre-feet/year):	<u>4,599.5</u>	
Estimated total amount of water to be saved (acre-feet):	<u>45,995</u>	
Over ____ years _____	<u>10</u>	
Benefit/cost ratio of project for applicant:	<u>6.88</u>	
Estimated \$/acre-feet of water to be saved:	<u>\$75.47</u>	
9. Project life (month/year to month/year):	<u>10/3 -9/04</u>	
10. State Assembly District where the project is to be conducted:	<u>1, 6-8, 11, 15</u> <u>16, 18, 20-24, 27,28</u>	
11. State Senate District where the project is to be conducted:	<u>2,3,4,7,9-11, 13-15</u>	
12. Congressional District(s) where the project is to be conducted:	<u>1,3,7,9-11, 13-17</u>	
13. County where the project is to be conducted:	<u>Alameda, Contra Costa, Marin, Santa Clara,</u> <u>San Mateo, Sonoma, Yolo</u>	
14. Do the actions in this application involve physical changes in land use, or potential future changes in land use?	<u>No</u>	

Proposition 13 ET Irrigation Controller Proposal

A-2 Application Signature Page

By signing below, the official declares the following:

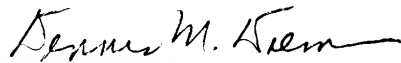
The truthfulness of all representations in the application;

The individual signing the form is authorized to submit the application on behalf of the applicant;

The individual signing the form read and understood the conflict of interest and confidentiality section and waives any and all rights to privacy and confidentiality of the application on behalf of the applicant; and

The applicant will comply with all terms and conditions identified in this Application Package if selected for funding.

Dennis M. Diemer, General Manager



Signature

11/27/02

Date

Approved As To Form and Procedure:

By: 

Date

11/26/02

for the Office of the General Counsel

A-3 APPLICATION CHECKLIST

Complete this checklist to confirm all sections of this application package have been completed.

Part A: Project Description, Organizational, Financial and Legal Information

- ☒ A-1 Urban Water Conservation Grant Application Cover Sheet
- ☒ A-2 Application Signature Page
- ☒ A-3 Application Checklist
- ☒ A-4 Description of project
- ☐ A-5 Maps
- ☒ A-6 Statement of work, schedule
- ☒ A-7 Monitoring and evaluation
- ☒ A-8 Qualification of applicant and cooperators
- ☒ A-9 Innovation
- ☒ A-10 Agency authority
- ☐ A-11 Operation and maintenance (O&M)

Part B: Engineering and Hydrologic Feasibility (construction projects only)

- ☐ B-1 Certification statement
- ☐ B-2 Project reports and previous studies
- ☐ B-3 Preliminary project plans and specifications
- ☐ B-4 Construction inspection plan

Part C: Plan for Environmental Documentation and Permitting

- ☐ C-1 CEQA/NEPA
- ☐ C-2 Permits, easements, licenses, acquisitions, and certifications
- ☐ C-3 Local land use plans
- ☐ C-4 State and local statutes and regulations

Part D: Need for Project and Community Involvement

- ☒ D-1 Need for project
- ☒ D-2 Community involvement, support, opposition

Part E: Water Use Efficiency Improvements and Other Benefits

- ☒ E-1 Water use efficiency improvements
- ☒ E-2 Other project benefits

Part F: Economic Justification, Benefits to Costs Analysis

- ☒ F-1 Net water savings
- ☒ F-2 Project budget and budget justification
- ☒ F-3 Economic efficiency

Appendix: Benefit/Cost Analysis Tables

- ☒ Benefit/Cost Analysis Tables 1; 2; 3; 4a, 4b, 4c, 4d; and 5

A-4 DESCRIPTION OF THE PROJECT

The major water agencies in California have come together to create a statewide initiative to target the replacement of standard irrigation controllers with self-adjusting, EvapoTranspiration (ET) weather-based controllers at residential and small commercial sites. Metropolitan Water District is submitting a proposal for water agencies in Southern California. East Bay Municipal Utility District (EBMUD) has agreed to serve as lead agency representing a coalition of Northern California water agencies, including:

- East Bay Municipal Utility District
- Alameda County Water District
- Contra Costa Water District
- City of Davis
- Los Trancos County Water District
- Santa Clara Valley Water District
- Sonoma County Water Agency

This coalition proposes an EvapoTranspiration Controller Program for both residential and commercial customers throughout Northern California

The Project entails the installation of 4,085 ET (“Smart”) irrigation controllers in residential and small commercial landscapes throughout the service areas of the participating agencies, and a final assessment report to address a variety of issues about this new generation of controllers. Numerous studies and water efficiency programs conducted statewide have demonstrated that significant water is lost due to over-irrigation. ET controllers save water by changing irrigation schedules much more frequently and more accurately than controllers that are manually adjusted by end-users. Currently ET controller irrigation schedules follow either average historical or real-time evapotranspiration (ET) data. Other control technologies introduced by manufacturers during the Project term may be installed if independent testing establishes their performance capability.

Total water savings, based on the optimal implementation level, projected over the 10-year life of the devices, is estimated at 45,995 acre-feet (AF). The total project cost, including monitoring and evaluation, is \$3,471,267, of which \$1,186,029 will be provided by the participating agencies in either hard dollars or in-kind services. The balance of \$2,285,238 is requested in Proposition 13 Grant funds.

Two primary program implementation methods will be used – Self-Install by the end user coupled with a training workshop and a voucher, and Direct Install by member agency staff and/or an independent, trained installation crew. Other variations on these two methods may evolve, depending on local situations and resources of participating agencies that implement ET controller programs at the local level.

Targeting of excessive irrigation water users will be essential to achieve the highest level of Project cost-effectiveness. Targeting methods will vary depending on data available to participating agencies. Selection criteria for recipients of ET controllers will depend on a variety of criteria, such as water used in excess of calculated water budgets, landscape area in excess of a specified threshold size, abnormally high water

use for sites within specific lot-size categories, excess water use identified by on-site water use efficiency surveys, and categories of high water-using customers.

The Project includes a Final Report that will assess the Program's effectiveness. Effectiveness will be measured in terms of actual water saved versus Program expenditures, but the report also will assess the advantages and challenges experienced with each of the implementation methods, the relative effectiveness of various types of ET controllers in saving water, the impact of signal fees on controller choice and long-term participation, the rate of decline in savings over time and by type of ET controller, and the ease of the end-user to install and program the controllers.

Overall, the Project will have great value both for its water savings, and the reduction on Bay/Delta demand that results from those savings, and for the knowledge gained about emerging approaches to efficient irrigation control.

EBMUD is the Principal Applicant for this program and will act as Program Administrator. It is the applicant's intent to work in collaboration with Metropolitan Water District, whose proposal is submitted under separate cover.

The EBMUD/MWD partnership will benefit all parties with program cost economies and management efficiencies. The alliance will offer significant negotiating and purchasing strength with product manufacturers. Second, a common data tracking system will be developed that will result in common formatting, easier application, and program evaluation and reporting. A third significant benefit will be the universal marketing message and strategy in customer outreach.

EBMUD's coalition of participating water agencies will be the Program Implementers, conducting the marketing, customer service and, where applicable, installation processes. One of the major benefits of utilizing the EBMUD and their coalition of water agencies is their well-established local network and their experience in implementing water conservation programs tailored to their own unique customer base. The existing agency infrastructure allows for rapid program deployment and drives down program costs.

A-5 MAPS

Not applicable for this project.

A-6 STATEMENT OF WORK, SCHEDULE

Project Plan

For this Project, water agencies throughout California have come together to jointly develop implementation methods that address residential and small commercial landscape applications. We propose to work with the Metropolitan Water District (Program Administrator for the Southern California project) and their co-operators to jointly develop product specifications, qualify ET controller products, and negotiate for and purchase product for the two projects. The economies and synergies achieved through a multi-agency approach to implementation will be reflected in a variety of ways:

- Coordinated and centralized procurements of product will achieve a more rapid transformation of the market.
- Centralized procurements of product will yield better pricing and terms from the manufacturers.
- Ongoing parallel agency projects throughout the state will provide the data and feedback necessary to properly evaluate and compare the effectiveness of the methods of implementation within regions of varying demographics.
- Ongoing parallel agency projects will stimulate communication among the agencies and lead to beneficial synergies that might not otherwise occur.
- Development of a single technical specification for ET irrigation controllers will enable manufacturers to produce a single product for all agency programs in the state.
- Quality assurance will become more cost-effective when implemented uniformly throughout the state.
- Consumer awareness will be enhanced and regional marketing will be more effective with a coordinated and focused marketing outreach.

Project Objectives

Goals	<p>Installation of 4,085 ET controllers</p> <p>Regional approach in support of statewide market transformation</p> <p>Ongoing water savings from Project installations and from natural replacement of controllers through transformation of market</p>
Geographic Coverage	Participating water agencies throughout northern California
Project Timeframe	3 years (savings benefits to extend for useful lifetime of ET controller devices, estimated at 10 years)
Savings	<p>45,995 acre-feet of water (over 10 years) at the optimal implementation level</p> <p>30,477 acre-feet of water at a lower level of implementation</p>
Target Market Segments	<p>Residential and commercial customers who meet all of the following criteria, depending on agency:</p> <p>Irrigation area ranging upwards from a minimum of 1,500 square feet for residential controllers.</p> <p>Irrigation area ranging upwards from a minimum of 8,000 square feet for 12-24 station commercial controllers</p> <p>Irrigation area ranging upward from a minimum of 12,000 square feet for 24-48 station commercial controllers</p> <p>Customers with existing controllers</p> <p>Customers that do not currently deficit irrigate</p>

Different implementation methods have been developed for this Project. The Northern California coalition of water agencies will each select the best method(s) and adapt them to meet the needs of their own customer base. The customer intervention methods are as follows:

- Residential and Small Commercial Vouchers and/or Landscape Workshops
- Residential and Small Commercial Direct Installation

During the three-year Project, EBMUD and the Northern California coalition of water agencies will gather customer response data, costs, and technical feedback for each of the intervention methods. Service offerings will have differing levels of success. Adaptive management principles will be employed, and the low-performing or unfeasible (for cost and/or technology reasons) options will be ramped down and replaced with one or more methods with a higher success rate.

Highlights of the different implementation methods are summarized below.

Residential and Small Commercial Vouchers and/or Workshop

Program Description	<p>Voucher programs are designed to overcome the customer's capital outlay concern. Vouchers offer a point-of-purchase discount while still providing controls for customer qualification and participation tracking.</p> <p>The voucher approach will be based on a fulfillment model. Water agencies will contract with the manufacturers, and the manufacturers will perform the fulfillment services. Some agencies may offer voucher-only programs, others may offer workshops in conjunction with voucher programs.</p> <p>The workshops will demonstrate to the customer how to: conduct a simple outdoor landscape survey (identifying soil type, plant type, sprinkler type, and microclimate)</p> <ul style="list-style-type: none"> • remove old controller • install new controller • program new controller
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Start Up Requirements	<p>Standard Program Start Up with Additional Requirements for:</p> <p>Contract Execution with Manufacturers</p> <p>Product Fulfillment through Manufacturers</p> <p>Set Up Voucher Payment Processes for Manufacturers</p> <p>Customer Workshop Design</p> <p>Certified Landscapers Workshop Design</p>
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Marketing and Customer Education	<ul style="list-style-type: none"> • Targeted Bill Inserts • Targeted Direct Mail • Targeted Newspaper Ads
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**Residential and Small Commercial
Vouchers and/or Workshop**

Customer Enrollment	Customer Calls Agency or Contractor and Requests Application or Receives Application at Workshop. Agency/Contractor Qualifies Customer and Enrolls in Program Agency/Contractor Sends Voucher to Customer - Customer Sends Voucher Application to Manufacturer and/or Customer Enrolled at Workshop and Provided Either Controller or Voucher at Completion of Workshop.
Product Distribution	Vouchers will be processed as follows: Manufacturer Sends Product to Customer Customer Sends Completed Application to Manufacturer and Agency/Contractor Manufacturer Bills Agency/Contractor
Installation	Customer Self Installs or Customer Hires Contractor to Install
Installation Verification	5-10% On-site Inspections

Residential and Small Commercial Direct Install

Program Description	<p>Direct install programs are designed to overcome many traditional customer barriers – the customer simply calls for an appointment and the product is installed by a representative of the water agency. They are especially effective when dealing with hard-to-reach customers such as the small commercial and residential markets.</p> <p>This design is the most expensive option, but will produce the highest participation levels.</p>
Target Customer	<p>Irrigation area ranging upwards from a minimum of 1,500 square feet for residential controllers, depending on agency.</p> <p>Irrigation area ranging upwards from a minimum of 8,000 square feet for 12-24 station commercial controllers, depending on agency</p> <p>Irrigation area ranging upward from a minimum of 12,000 square feet for 24-48 station commercial controllers, depending on agency</p>
Start Up Requirements	<p>Standard Program Start Up and Additional Requirements for:</p> <ul style="list-style-type: none"> Installer Training Process for Scheduling Installation Appointments Process for Handling Customer Installation Problems
Database and Administration	<p>Standard Program Database with Scheduling Capabilities</p> <ul style="list-style-type: none"> Track Installations Evaluate Quality of Installations Track Customer Installation Problems and Resolutions
Marketing and Customer Education	<ul style="list-style-type: none"> Direct Mail Telemarketing
Production Estimates	<p>Continued customer participation, assuming funding and ongoing marketing efforts.</p>
Customer Enrollment	<p>Customer Qualified and Enrolled during Scheduling Call</p> <p>Customer Qualification Criteria Must Include:</p> <ul style="list-style-type: none"> Working Controller Install Inside Garage on Wall or Outside in Weather-Proof Plastic Box
Product Distribution	<p>Product Brought to Installation</p>

Residential and Small Commercial Direct Install

Installation	<p>Conduct Simple Outdoor Survey</p> <p>Second Round of Qualification Criteria Applied On-Site and Includes:</p> <p>Assessment of Controller and Irrigation System</p> <p>If System Fails Test, Customer Requested to Fix Before Installation Can Occur</p> <p>Precipitation Tests on 50% of Sites</p> <p>Field Personnel Removes Old Controller and Installs and Programs New Controller</p>
Installation Verification	<p>1-5% On-Site Inspections</p> <p>Lower Inspect Rate Because Staff/Contractors Perform Installation</p>
Pros/Cons	<p>Potential Liability for Product Installation and Health of Landscape</p> <p>Higher Response Rate and Lower Marketing Costs Likely</p> <p>Maximum Water Savings Because Staff/Contractors Program Controller</p>

ET Controller Pilot Studies

Several water agencies have conducted pilot studies of ET Controllers over the past few years. Western Policy Research conducted the “Residential Weather-Based Irrigation Scheduling: Evidence from the Irvine ‘ET Controller’ Study”, July 2001, on behalf of the Irvine Ranch Water District, Municipal Water District of Orange County and Metropolitan Water District of Southern California. A test group of 40 homes were retrofitted with ET Controllers. Two other sets of households were included in the evaluation, a reference group and a “postcard” group. The postcard group received mailed notices with recommended irrigation schedules. Savings were estimated by comparing two years of pre-installation and one year of post-installation consumption data. The data was re-evaluated after a second year, in the ET Controller Savings through the Second Post-Retrofit Year, A Brief Update report. The study concluded that the water savings from ET Controllers were equivalent to 18% of outdoor water usage. The ET Controllers saved 57 gallons per day on lot sizes of approximately 2,000 sq. ft. The second-year post study found no evidence of a savings decline over time.

Denver Water in Colorado is currently conducting a four-year study of ET Controllers, in which 37 controllers were installed throughout the Denver Metropolitan Area. Water usage for a control group of 800 non-participant irrigation users is also being evaluated. Results from the first year post-retrofit, weather-adjusted data, show a 21.47% average decrease in outdoor water usage in comparison with five years of historic usage.

Valley of the Moon Water District and the City of Sonoma, both in Sonoma County, have initial data from pilot programs that show a reduction of 28% and 23%, respectively, compared to historic usage. Valley of the Moon’s usage was compared with previous 5-year historic average and City of Sonoma with the previous 2-year historic average. A total of 27 controllers were installed in the Valley of the Moon Water District and 10 in the City of Sonoma. It should be noted that the irrigation controllers in these two programs were installed after the irrigation season had started.

EBMUD recently initiated an ET Smart Controller Pilot Study in which customers are offered a voucher up to \$300 for installing qualifying controllers to replace existing conventional controllers. A brief description of the program and sample forms are provided in Appendix D.

Excess Irrigation and Savings Potential

The 1999 AWWA Residential End Uses of Water Study found that a significant portion of residential consumption is devoted to irrigation (58%). The study also found that homes with automatic sprinklers use 47% more water than those without automated systems. Much of the problem is due to the complexity and time involved in developing irrigation schedules. The following information from Metropolitan Water District and from Contra Costa Water District illustrates the potential for water savings from more efficient irrigation use.

Metropolitan Water District Analysis of Excess Water Use

Metropolitan Water District of Southern California analyzed data from landscape programs conducted within its service area. SDCWA’s PALM Program, which primarily focuses on large, non-residential landscapes, performed water efficiency surveys on 107 sites in FY 2001-02. The irrigation efficiency of the sites, expressed as a percent of evapotranspiration (ET_o), were as follows: commercial - 173%, apartments – 138%,

large residences – 114%, institutions – 99%, HOA's – 98%, and parks – 64%¹. The total weighted irrigation efficiency for these sites is 116%. Assuming that mixed landscapes require 80% of ETo, there exists a potential water savings of 36%.

Contra Costa Water District Landscape Evaluation – Commercial Sites

Contra Costa Water District's conducted an evaluation of its commercial landscape water audit program, Landscape Water Audit Evaluation, August 1994. The study evaluated 62 commercial sites that were targeted for participation in the landscape audit program based on high water usage. The study concluded that an average of 85.68" of irrigation water was being applied to the sites. The normal year ETo for Contra Costa is 53.48". That represents excess irrigation use of 32.2" per year. The Contra Costa sites were commercial sites with an average square footage of 74,891 and a median square footage of 41,330. Small commercial sites have traditionally been the most difficult sites to manage. Therefore, we expect that the potential for savings through installing ET controllers is higher than for residential sites.

Targeting

Targeting of high users for will be a key element of this program in order to maximize water savings. Participating agencies will use a variety of different strategies, including:

- Using water use efficiency survey data, both residential and commercial to identify targeted lot sizes and high water users (excess irrigation)
- Customers with landscaped area in excess of a threshold lot size
- Abnormally high water use for sites within specific lot-size categories
- Grouping accounts with comparable lot sizes and selecting the customers with the highest water usage per area.
- Water usage exceeding an allocated water budget

¹ San Diego County Water Authority, [PALM Program Annual Report, July 2001 – June 2002](#), page 5.

Preliminary Product Specifications

During Project start-up, a project team will develop detailed product specifications for ET controllers that qualify. However, there are certain basic requirements that will apply, including:

- Controller is self-adjusting based on Eto and/ or weather changes
- Local ET-based irrigation controller
- Multiple start-times
- Multiple stations/valves
- Adjustable test cycle
- Microclimate adjustments
- Accumulation feature
- Residential grade models
- Commercial grade models
- Technical Specifications

Basic technical specifications are as follows:

- Industry standard hook-ups (replaces any controller)
- Operating Ambient Temperature: 0 to 50° C
- Input operating voltage: 105 VAC to 135 VAC
- Output: 24 VAC
- Minimum number stations – residential grade: 6
- Minimum number stations – commercial grade controllers: 12
- Weather-proof case for outdoor installations (as required)
- Non-volatile memory
- 9 V battery back-up

Manufacturer Capabilities

Existing ET Controller manufacturers have been contacted regarding their abilities to meet the production targets outlined in this proposal. We have received assurances from the manufacturers that they have the necessary resources to meet the stated production goals.

Task List and Schedule

The program is scheduled to begin in October of 2003 and run for three years, including a six-month start-up period.

For EBMUD and the Northern California coalition of water agencies, marketing outreach and production will begin in October of 2003 and ramp up as each program intervention method is initiated.

- Voucher processing will begin in April 2004;
- Workshops will begin in May 2004;

- Direct installations will begin in May 2004;
- By July, 2004, the program will reach full production levels.

Below is a detailed program implementation timeline:

Program Implementation Chart

Tasks	Schedule
DWR Selects ET Controller Program for Funding	April 2003
Water Agencies Commit to Production Targets and Type(s) of Interventions	May 2003
Water Agencies Obtain Cost-Sharing Commitment Letters	May 2003
Contract Negotiations Conducted between DWR and Principal Applicant	May 2003
Contract Executed by DWR with Principal Applicant, Project Begins	October 2003
Program Operations, Monitoring and Assessment Plan Finalized	October 2003
MOUs and/or Agreements Executed with Principal Applicant and Participating Water Agencies	October 2003
Product Specifications	
Product Specifications Developed	Oct – Nov 2003
Products and Technologies Evaluated Against Specifications	Nov – Dec 2003
Eligible Product List Generated	January 2004
Prices, Production and Delivery Schedules Negotiated with Product Manufacturers	January 2004*
Water Agency Personnel Trained on Approved Products	March 2004
Program Information Systems	
Required Program Data Identified	October 2004
Centralized Computer Tracking System and Database Developed and Tested	Nov 2003 – Apr 2004
Internet Services, Data Access, and Security Protocols for Customers and Water Agencies Created	Jan – Feb 2004
Data Transfer Protocol, Format and Frequencies Developed	December 2004
Program Forms, Reports and Invoices	
Standardized Program Forms Developed for Each Intervention Method	January 2004

Tasks	Schedule
Standardized Reports and Reporting Requirements Developed	January 2004
Standardized Invoices and Procedures Developed	January 2004
Water Agency Personnel Trained on: Form, Report, and Invoice Completion Computer System Usage	March 2004
Program Marketing and Production Planning	
Marketing Strategies Created for Each Intervention Method	Nov 2003 – Jan 2004
Productivity Milestones Generated for Each Marketing Method	January 2004
Calendar of Outreach Campaign Generated	January 2004
Program Theme and Logo Developed	February 2004
Marketing Collaterals Developed for Each Intervention & Marketing Method	March 2004
Marketing Templates Created for Each Water Agency, including: Calendar of Marketing Activities Production Planner Marketing Collaterals	March 2004
Water Agencies Trained on Marketing Tools	March 2004
Program Operations, Standard and Controls	
Operational Policies and Procedures Developed for Each Intervention Method	Nov – Jan 2004
Controls and Standards Developed for: Customer Service Processing/Fulfillment Turn-around Time Verification Inspections Fiduciary Processes Security and Confidentiality of Data Data Transfer, Reporting & Invoicing Accuracy and Schedule	Nov – Jan 2004
Create Master Program Flow Integrating Operational Processes and Controls	February 2004

Tasks	Schedule
Create Calendar for Audit Events	February 2004
Train Water Agency Personnel on Operational Procedures, Standards, and Controls	March 2004
Monitoring and Assessment Plan	
Monitoring and Assessment Plan Finalized	November 2003
Develop Research Plan	November 2003
Water Agency Involvement in Monitoring and Assessment Outlined	December 2003
Conduct Workshop	January 2004
Water Agencies Trained in Monitoring and Assessment Requirements	March 2004
Conduct Process Evaluation Develop Interview Instrument Conduct Interviews Compile and Analyze Responses Draft and Disseminate Results	All Three Years
Conduct Impact Evaluation Develop Sampling Plan and Consumption Data Protocol Collect Pre-installation Water Use and Other Data Clean Data, Draw Sample, Construct Sampling Weights Collect Daily Weather Data from Multiple Weather Stations Conduct Water Use Modeling Analyze Cost Effectiveness	All Three Years
Prepare and Submit Program Evaluation Results	End of Year 1 End of Year 2 End of Year 3
Modify Program Based on Evaluation Results	Ongoing
Customer Questionnaire Developed to Assess Customer Satisfaction	January 2004
Conduct Customer Satisfaction Surveys	All Three Years
Compile and Evaluate Customer Satisfaction Results	All Three Years
Modify Program Based on Customer Satisfaction Results	Ongoing
Implementation Contractor(s) Selection	

Tasks	Schedule
Water Agencies Determine Internal vs. External Program Implementation	November 2003
Standard RFPs Prepared by Water Agencies	December 2003
List of Qualified Implementation Contractors Created	December 2003
Water Agencies Conduct RFP Process and Select Program Implementation Contractor(s)	Jan – Feb 2004
Program Template Development	
Small Commercial and Residential Workshop Templates Developed	Jan – Feb 2004
Small Commercial and Residential Installation Guidelines Developed	Jan – Feb 2004
Small Commercial and Residential Installer Training Developed	February 2004
Water Agency Installer Training	March 2004
Program Kick Off	April 2004
Program Marketing Begins	April 2004
Voucher Processing Begins	April 2004
Small Commercial and Residential Landscape Workshops Begin	May 2004
Small Commercial and Residential Direct Installations Begin	May 2004
Weekly and Monthly Reporting	May 2004
Field Inspections Begin	May 2004
First Quarterly Report and Invoice Submitted to DWR	July 2004

Program Flexibility

This project is designed to enable participating agencies to customize program implementation methods to maximize effectiveness within their service area. As an example, agencies with ongoing landscape water audit programs may opt to combine the ET Controller program with the audit program.

Flexibility also is provided by the option to reallocate ET Controllers from one service area to another with the consent of participating agencies. Additional agencies also may be added to the coalition, if the project is demonstrated to be locally cost-effective in their service areas. With the consent of the DWR, agencies could be added to the mix if implementation of participating agencies failed to reach projected levels.

Scalable Levels

We have considered two scalable levels of implementation for this project, as shown in the table below. The optimal level is the higher level of 4,085 controller installations

proposed; however, the Project could be implemented at a lower level of 2,605 controller installations. The lower level of implementation does raise the costs of program implementation, since costs of some key functions are relatively fixed and are amortized over the total number of units (e.g., database design and development, project coordinator, industry liaison etc.). Analyses of both levels are included in Appendix A (optimal level) and Appendix B (lower level). The discussion here focuses primarily on the optimal level of implementation.

	High (Optimal Level)	Low Level
Total Installations	4085	2605
Total Project Cost	\$3,471,267	\$2,418,034
Expected Water Savings	45,995 AF	30,477 AF
Grant Funds Requested	\$2,285,238	\$1,660,725

Projected Costs

On the following pages are tables indicating production estimates, program costs, and quarterly expenditure estimates. The projected costs shown here are for the optimal level of implementation. Details for the costs related to the low level of implementation are shown in Appendix B. Listed below are the estimated production and costs per implementation method and customer target.

		Implement- ation	Central Admin	Start- Up	Monitoring & Assessment	Total Units	Extended Costs
Residential Controllers Cost	Direct Install	\$442.14	\$69.77	\$31.82	\$42.84	295	\$173,038.74
	Self- Install	\$360.69	\$69.77	\$31.82	\$42.84	2,021	\$1,020,851.56
Commercial Controllers 12-24 Station	Direct Install	\$1,054.69	\$69.77	\$31.82	\$42.84	190	\$227,833.07
	Self- Install	\$836.34	\$69.77	\$31.82	\$42.84	748	\$733,618.87
Commercial Controllers 24-48 Station	Direct Install	\$1,515.78	\$69.77	\$31.82	\$42.84	200	\$332,041.81
	Self- Install	\$1,297.27	\$69.77	\$31.82	\$42.84	631	\$909,713.47
Some error due to rounding and factoring							
						4,085	\$3,397,097.53
						Plus Signal Fees Year 1	\$72,472.20
						Total:	\$3,469,569.73

Cost includes amortized start-up, program marketing, implementation, administration, and equipment.

Listed in the table below are the unit costs for each of the implementation methods.

Implementation Method	Est. Total Cost for Task	Self-Install Workshop with Voucher Residential Up to 12 Station	Self-Install Workshop with Voucher Commercial Up to 24 Station	Self-Install Workshop with Voucher Commercial Direct Install Commercial
		Residential Controllers Up to 12 Station	Commercial Controllers Up to 24 Station	Commercial Controllers 24 to 48 Station
Volume Basis for Estimated Costs		1000 \$	1000 \$250.00	1000 \$250.00
Voucher Processing & Admin		\$10.00 \$2.00		\$10.00 \$2.00
Vendor Negotiation	\$2,000.00	\$7.00	\$25.00	\$10.00 \$40.00
Marketing				
Workshop - Marketing (\$750 X 40)	\$30,000.00	\$30.00		\$30.00
Workshop- Development	\$2,000.00	\$2.00	\$2.00	\$2.00
Workshop -Staff (\$250 per 2 hr workshop	\$10,000.00	\$10.00	\$10.00	\$10.00
Additional Program				
Administration (Data Entry, Tracking, Phones, Customer Service, Reporting)		\$5.00	\$5.00	\$5.00
Certified Contractor				
Workshop 2000 develop + 2 x \$2000 workshop	\$6,000.00	\$6.00	\$6.00	\$6.00
Customer Serv/Liability		\$6.00	\$6.00	\$6.00
Unit Cost Per Inspection		\$5.00	\$5.00	\$5.00
Customer Satisfaction - mail in postcard	\$2,500.00	\$2.50	\$2.50	\$2.50
Sub-Total		\$129.60	\$132.60	\$132.60
Plus Central Admin		\$69.77	\$69.77	\$69.77
		\$211.05	\$351.05	\$351.05
		\$69.77	\$69.77	\$69.77

Proposition 13 Urban Grant ET Controller Proposal

Product Cost-Modified Real-Time ET	\$234.60	\$234.60	\$446.09	\$446.09	\$887.12	\$887.12
Total Cost per Modified Real-time ET unit	\$433.97	\$515.42	\$648.45	\$866.90	\$1,089.49	\$1,307.94
Product Cost Real-Time ET Cost	\$222.50	\$222.50	\$1,125.77	\$1,125.77	\$1,616.25	\$1,616.25
Total Cost Per Real-Time ET Unit	\$421.87	\$503.32	\$1,328.14	\$1,546.59	\$1,818.62	\$2,037.07

Quarterly Expenditure Projection

Listed in the table below are the estimated quarterly expenditures for the proposed program at the optimal (high) level of implementation

	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Total
Year 1	\$ -	\$40,000	\$396,524	\$321,643	\$758,167
Year 2	\$338,624	\$338,624	\$338,624	\$338,624	\$1,354,497
Year 3	\$338,624	\$338,624	\$338,624	\$338,624	\$1,354,497
Total Expenditures					\$3,467,161

Some errors due to rounding, factoring, and allocation of costs

A-7 MONITORING AND EVALUATION

A key element of a successful program will be ongoing monitoring and assessment of performance, including:

- Developing and maintaining a centralized relational program database;
- Performing verification inspections;
- Conducting customer satisfaction surveys;
- Administering a full-scale process and impact program analysis.

This information will be used to modify the program as indicated to ensure the highest potential for success.

Centralized Database

A centralized database will be developed for this project. Individual copies of the centralized database will be made available to individual agencies for in-house or contractors use. Each participating agency will be required to provide an updated copy of their local program database when submitting invoices for payment. The updated copies will then be merged into the master project database. This approach offers several benefits:

- Economies of scale with respect to database development and administration
- Consistent data structure and format
- Ease of use for analysis and study purposes due to the consistent data structure and format
- Centralized reporting capabilities

Using a consistent structure and format, each participating agency will operate its own program database and will be able to incorporate supplementary features that may be required to accommodate local conditions.

A project team will develop specifications for the database during the start-up phase of the project. The data will include, at a minimum, the following information:

- Participating agency
- Individual customer information (account number, name, address)
- Installation location
- Installation date
- Type of distribution method
- ET controller type and model
- Square footage of irrigated landscape at the site

Additional data fields will be determined during the start-up phase.

Reporting

The database will be used to generate program status reports on a monthly and quarterly basis for comparison against program implementation targets. Yearly reports and a final project report will also be created. The monthly reports will show sub-total

information for individual participating agencies, as well as for the program overall. Standard summary reports showing information for the reporting period, as well as cumulative information, will include, at a minimum:

- Total number of ET Controllers installed
- Number of ET Controllers by program implementation method
- Quantities of the types and models of ET-Controllers installed – totals as well as by implementation method
- Irrigated area

Detailed reports will be designed based on the specifications developed during the planning phase. Additional reports will be developed, as necessary, to facilitate program implementation and evaluation.

Customer and agency feedback will also be tracked in order to evaluate the effectiveness of the program.

Verification Inspections

Approximately 16% of the ET Controllers proposed for installation under this Project will be installed directly by water agency personnel or by contractors. For these installations, field reports from the installers will serve as verification of installation.

For the remaining 84% of installations, all of which rely upon the customer to install, an independent (third-party) verification process will be implemented.

This verification process will involve on-site inspection of a random sample of reported installations. Samples will be stratified in accordance with method of implementation (voucher, direct install, etc.) and the intended end-use (residential, commercial) and will be based upon a 95% confidence level that the result will be within $\pm 2\%$ of the actual installation percentage. In the event that, during Year 1 of the Project, in excess of 99% of the reported installations are found to be installed, the independent verification process may be modified or suspended (with the approval of the DWR).

The independent verification process will begin field inspections of the randomly selected sites no sooner than 45 days and no later than 90 days following the date of reported ET Controller installation². Results of the independent verification process will be reported on a quarterly basis.

Process and Impact Evaluation

Three different types of questions are raised by this Project. One type of question is practical—how effective are the different programs/intervention methods in gaining the participation of customers? The second type of question is empirical—what is the net change in water use attributable to ET controllers? A related question, of course, pertains to the costs and benefits of ET controller programs—are they worth doing?

There are relationships between the questions. The design of ET controller programs can minimize unnecessary costs, increase the likelihood of customer participation and

² A minimum period of 45 days is proposed to assure that the customer has ample opportunity to install and operate the ET Controller and provide the inspector with customer feedback. A condition of the installation will be that the old irrigation clock/timer be removed by the customer and provided to the water agency.

retention, and, thereby, increase the benefits produced by these programs. The magnitude of water savings is a key determinant of Project benefits to water/wastewater utilities, the Bay Delta, and society. An integrated evaluation approach is proposed to address these interrelated issues.

Overall Evaluation Approach

The research approach is designed to be both flexible and dynamic. Phase I will be conducted in six months and will develop the research approach, draft interview instruments, develop a consistent consumption data submission protocol, and define expected results.

Phase II will seek to provide the earliest possible set of evaluation results that could feed back into program design and, thereby, improve program effectiveness (months 7-18).

Phase III will involve a higher-resolution examination of the intervention methods to address questions of potential impacts if applied to other customers and/or water agencies (month 19 to project conclusion.)

The following two sections discuss questions to be addressed and methods for developing a corresponding set of answers.

Questions to be Addressed

Questions about ET controller program impacts are of two kinds – external vs. internal validity (what may be inferred about the impacts of programs implemented) and the feasibility of implementation (customer acceptance, industry support, sustainable financing) vs. effectiveness (what benefit at what cost).

Feasibility - Implementation Success

- How satisfied were participating customers?
- How could the programs be modified to increase participation?
- How could the programs be modified to decrease attrition?
- How did intervention methods (direct versus self-install) differ?

Effectiveness - Benefits and Costs

- How much water was saved by participants (gross savings).
- How much water was saved by non-participants (ongoing savings).
- How much additional water was saved by participants (net savings).
- Are there any “spillover” effects of program participation?
- What is the relationship between savings and wastewater flow/urban runoff?
- How do savings vary?

By type of controller used?

- By intervention type (direct vs. self-install)?
- By customer segment (residential vs. commercial)?
- By size of irrigated area?
- By climate zone (inland vs. coastal, north vs. south)?

Questions of external validity could include:

- The effects of the same program targeted toward other customers.
- The effects of the same program expanded statewide.
- The potential effect of a differently configured program (small vs. large lots)
- The projection of water savings into the future (persistence).

Methods

Given the differences among types of ET controller programs, an adaptive research design will be used that incorporates multiple data collection methods, including:

Process Evaluation – Process evaluation addresses the effectiveness of the different programs in achieving program participation and retention. The process evaluation is budgeted at \$30,000.

Water Agency Staff Interviews - In-person focused interviews with agency staff responsible for implementation (program success, factors important in success, weaknesses, strengths, and areas for improvement.) Interviews also will be conducted with agency financial and managerial staff. (revenue effects, assessment of financial planning complications, program success, factors important in success, weaknesses, strengths, direct and indirect program costs, and areas for improvement.)

Interviews with other Stakeholders - In-person focused interviews with representatives of the green industry, landscape professionals, and environmental advocates.

Customer Satisfaction Survey – The results of the survey of customer satisfaction will be integrated into the process evaluation of program/intervention method effectiveness.

Quarterly Progress Reports – The results of the quarterly progress reports will be integrated into the process evaluation to help clarify the reasons for observed differences in program progress.

Impact Evaluation - The impact evaluation will address the question of whether the different programs achieve their intended effect. The impact evaluation has been budgeted at approximately \$145,000.

Water Use Analysis - Using historical water use by account and multiple climatic measures, climate-adjusted estimates of water savings will be developed using regression methods. To the extent that comparable non-participants exist at some of the agencies, an assessment of net conservation could be attempted. The amount of additional effort allocated to this question will be determined after issues of data availability have been settled. This evaluation proposes providing the earliest possible indicators of differences in water savings by intervention method (Phase II). These results will be labeled as preliminary and subject to confirmation in the last year of the study (Phase III).

Cost-Effectiveness Analysis - A cost-benefit analysis will be performed and presented in a form compatible with CUWCC CEA guidelines. This will explicitly address additional indirect benefits of reduced urban landscape runoff, seeking to define a methodological

overlap with existing studies measuring urban runoff that could provide the necessary baseline data (IRWD study.)

Tasks

Task 1: Develop Final Research Plan This evaluation proposes developing a stratified sample of individual customers across the different program types and intervention methods. The technical literature on sampling traditionally has focused on ensuring that the sample is representative of the population from which it is drawn through randomization. Representativeness is an important concern, but one that can be addressed through the methods of scientific sampling. A formal sampling plan will be developed in Phase I.

The evaluation will be coordinating with numerous water agencies having potentially different characteristics in terms of population, distribution of population among different customer classes, climate, and lot size. All of these factors affect water use patterns and have a bearing on the extent and type of intervention methods that are likely to succeed in each area. Because of these agency-specific differences, stratification by agency will improve representativeness for a given sample compared to a simple random sample.

Over time we have found that theoretical calculations of required sample size are misleading and risky for several practical reasons (see Chesnutt et al. 1998 “A primer on sample size calculations”). The theoretical calculations are misleading because the questions asked of the evaluation can be more involved than simply measuring a mean change in water use. How does the mean change in water savings itself change over time? How do different program participants save differently? What explains differences in water savings? The theoretical calculations are risky for a different reason. A certain fraction of water consumption histories will not prove usable. This data attrition can leave the evaluator with an insufficient sample to draw robust conclusions. The sampling plan developed in Phase I will account for these practical considerations in developing a sampling approach.

Task 2: Process Evaluation – The process evaluation combines data generated by program implementers (progress reports, customer surveys) with structured interviews of implementers, other water agency staff, and other stakeholders. These focused interviews target the agency staff responsible for implementation (program success, factors important in success, weaknesses, strengths, and areas for improvement), financial and management staff (revenue effects, assessment of financial planning complications, program success, factors important in success, weaknesses, strengths, direct and indirect program costs, and areas for improvement.), and other stakeholders including representatives of the green industry, landscape professionals, and environmental advocates. A complete sampling of the first two groups will be attempted (two dozen interviews.) The interview protocol with agency will end with a collection of agency-specific information. A list of individuals in the third group (other stakeholders) will be developed in cooperation with the project administrator and representatives from the agencies.

Task 3: Water Use Analysis and Cost-Effectiveness analysis. The water use analysis seeks to develop sound empirical answers to the following questions:

Was the change in water use at a given site attributable to ET controller installation?

What explains the magnitude of the observed change?

The answer to the first question is simpler and requires less data (consumption records, the time of the installation). The answers to the second questions are necessarily more complex and require more data.

Using historical account level water use records and multiple climatic measures, the water use analysis would develop climate-adjusted estimates of water savings using panel data (time series cross section) regression methods. A comparable “control group” of non-participants must be developed to permit an assessment of net conservation. The amount of additional effort allocated to this question will be determined after issues of data availability have been settled. This evaluation proposes a cost-effective approach to water consumption sampling. It proposes to obtain large sample consumption histories for participating customers. Appropriate panel data estimators can ensure that unbiased estimates of water savings can be made without cross-sectional data on customer characteristics. Data on customer characteristics would be added later to answer the more involved questions of how the water savings vary across customers and intervention methods. In this way the analysis of water savings using consumption histories can be made independent of available measures of customer characteristics. This makes the impact evaluation more robust. On the other hand, the measures of customer characteristics, where available, can powerfully explain differences in observed water savings.

The water use analysis in Phase II will provide the earliest possible evidence of differential savings effects for linkage back into ongoing program design. These results would be narrowly disseminated and clearly labeled as preliminary. The water use analysis in Phase III could confirm hypotheses developed in Phase II and test for broader threats to inferential validity and reliability. Phase III will also include a cost-benefit analysis conducted in a form compatible with CUWCC CEA guidelines.

Task 4: Report and Dissemination Draft and final report, including process and impact evaluations.

- Web sites and water planning conferences.
- Discuss opportunities for expansion and applicability to other service areas.

Dissemination of study results will be done via:

- Final report
- AWWA conferences
- CUWCC web site committees
- Agency boards of directors
- Press releases

Program Feedback and Mid-Course Changes

As implementation proceeds and the customers provide feedback, it is anticipated that fine-tuning of the marketing, training, and installation processes will be required. This includes a possible re-focusing of efforts into areas more likely to (1) be more receptive to a direct-install initiative and (2) yield higher water savings per dollar invested.

In addition, as relationships with the controller industry solidify and mature, it is expected that their support and assistance will become more enthusiastic.

Because this Project's outreach efforts will be tailored by the implementing water agency to the specifics of the area in which it operates, significant benefits will accrue as successful marketing outreaches in one local geographic area are exported to other local areas and used by other agency implementers.

For these reasons, the Project provides for a formal monthly review of successes and failures in the areas of outreach and installation to ensure that the entire Project operates at the most cost-effective level possible.

A-8 QUALIFICATION OF THE APPLICANT AND COOPERATORS

Richard W. Harris, P.E.

***Manager of Water Conservation
East Bay Municipal Utility District***

As Water Conservation Manager, Richard Harris oversees the development and implementation of EBMUD's Water Conservation Master Plan in support of long-term water supply and demand management goals. With an annual budget of more than \$5 million, and a total projected program budget of \$92 million, EBMUD's water conservation efforts represent one of the largest staffed and budgeted conservation programs among major water utilities in the state. Mr. Harris is a licensed civil engineer and has been at EBMUD for more than 12 years. Prior to joining the Water Conservation Division, he managed the District's Water Recycling Program. Mr. Harris continues to serve as a District spokesperson on water use efficiency. Mr. Harris currently serves on the California Urban Water Conservation Council Steering Committee. Mr. Harris also serves as the EBMUD Energy Conservation Coordinator to the California Flex Your Power Campaign. Mr. Harris has more than 18 years experience in the environmental systems planning, engineering and resource management, and worked a number of years in the private sector specifically in the environmental engineering and energy management fields for Combustion Engineering Environmental, Inc. and Guaranteed Energy Savings, Inc.

Key Experience:

4/99 – Present Manager of Water Conservation - EBMUD

Responsible for managing the District's Water Conservation Division and directing the planning and implementation of the Water Conservation Master Plan to achieve 34 million gallons per day in water savings by the year 2020. Manage 19 professional staff and administer a \$92 million capital and operating program budget, totaling in excess of \$5 million annually.

4/98 - 4/99 Senior Civil Engineer – EBMUD, DERWA

Supervisor of ten professional staff in the Office of Reclamation and Wastewater Planning Sections. Served as the Engineering Program Manager for the DSRSD-EBMUD Recycled Water Authority, responsible for supervising and implementing a joint \$90 million water recycling project. Served as a member of the Executive Management Board and Chair of the Finance Committee for the Bay Area Regional Water Recycling Program.

11/96 - 4/98 Supervising Administrative Engineer – EBMUD

Program Manager for \$120 million Water Recycling Program. Responsible for planning and administration of new capital projects (\$7M - \$60M), operating projects (\$38M) and consultant management. District spokesperson on all water recycling matters with the community and elected officials.

7/87 - 7/89 *Technical Engineer – Combustion Engineering Environmental, Inc.*

Conducted environmental science and engineering field operations. Participated in all phases of the Materials Damage Study for the California Air Resources Board, including site installation and monitoring, sample preparation and processing, and report writing. A member of technical team conducting field services for the Rocketdyne Wastewater Sampling Program. Services included flow meter installation and calibration, channel design, field sampling, laboratory preparation and report writing.

1/85 - 11/86 *Manager, Southern Pacific Region/Conservation Engineer - Guaranteed Energy Savings, Inc.*

Responsible for field service activities in California, Arizona, New Mexico and Texas. Responsibilities included marketing, new project development, site surveys, and management support of energy conservation systems for contracts exceeding \$2 million. Performed computer system installation and complete electrical system support. Directed the work of the field electrical crews on energy savings programs; conducted contract negotiations.

Education:

Masters Degree, Civil Engineering, University of California, Los Angeles.

Bachelors Degree, Business Economics, University of California, Santa Barbara.

Bachelors Degree, Environmental Studies, University of California, Santa Barbara.

Affiliations:

Richard serves on the Board for the California Urban Water Conservation Council and is active in the American Water Works Association, Water Environment Federation and WateReuse Association.

Scott Sommerfeld

Water Conservation Representative East Bay Municipal Utility District

As EBMUD Water Conservation Representative, Scott Sommerfeld works with cities, counties, developers, and EBMUD customers to evaluate irrigation systems and make recommendations regarding irrigation standards and practices. He also manages EBMUD's ET Controller Pilot Study and chairs the Landscape Advisory Committee, a working group of "green industry" professionals.

Mr. Sommerfeld is a registered landscape architect with additional certifications in irrigation design and water auditing. Prior to joining the Water Conservation Division, he worked in various capacities for over 25 years in the field of irrigation design and construction, including landscape architect, irrigation consultant, water auditor, specification writer, construction administrator, plan reviewer, expert witness, speaker, and author.

Mr. Sommerfeld is a recognized expert in both drip and conventional overhead irrigation systems and computer-managed centralized systems. He has served on the executive boards of the Northern California chapters of both the American Society of Landscape Architects (ASLA) and the American Society of Irrigation Consultants (ASIC).

Key Experience:

9/98-Pres. Water Conservation Representative - EBMUD

Develops new programs for water conservation, including a pilot program that provides customers with a new smart ET irrigation controller. Conducts water surveys and provides advice and information related to water conservation, particularly in the area of efficient irrigation design. Reviews landscape and irrigation plans. Chairs the EBMUD Landscape Advisory Committee. Promotes water conservation through participation in professional organizations, including the Irrigation Association, American Society of Irrigation Consultants and the California Urban Water Conservation Council.

9/83 – 9/98 Senior Principal – Carducci & Associates, Inc., Landscape Architects

Project Landscape Architect for a wide range of landscape and irrigation projects. Responsible for client meetings, preliminary design, planting design, irrigation design, preparation of construction documents, proposals, contracts, specifications, field observation and construction administration. Initiated water management program which included plan checks, audits and irrigation system evaluations.

Education:

Bachelors Degree, Landscape Architecture, University of Wisconsin, Madison.

Affiliations:

American Society of Irrigation Consultants
Irrigation Association

Hossein Ashktorab

Unit Manager, Water Use Efficiency Unit Santa Clara Valley Water District

Present

Responsible for managing the District Water Use Efficiency Unit (WUE) providing technical direction, coordinating its activities with other District Units, and external stakeholders including 13 water retailers. The water conservation program is a long-term commitment of the District, which provides the highest quality programs and educational opportunities to residents and businesses in Santa Clara County.

Managing the implementation of all 14 BMPs required by the Memorandum of Understanding Regarding Urban Water Conservation in California (MOU). In addition, managing the adopted Water Conservation Plan (including agriculture water conservation program) to comply with US Bureau of Reclamation mandate as required by the Central Valley Project Improvement Act (CVPIA).

Manage and participate in the development, implementation and administration of the water conservation and water recycling programs with more than \$9 million annual budget in Santa Clara County.

Develop partnerships with local and regional cities including various water conservation programs with City of San Jose with more than \$3 million cost-sharing budget as well as cost-sharing agreement with six other agencies in Northern California for residential efficient clothes washing machine.

Participate and engage in the recycled water partnership such as South Bay Water Recycling cost sharing agreement for the amount of \$50 million projects in the Santa Clara County.

Participate and coordinate with local, regional and statewide water conservation and recycling organizations. Member of CUWA water conservation committee and CUWCC steering, plenary, Program committees and several subcommittees.

Water Conservation Specialist, Santa Clara Valley Water District

Developed and managed water conservation programs including programs for agricultural and large landscape water users.

Technical staff to District Landscape Water Advisory Committee, and District Agriculture Water Advisory Committee.

Responsible for implementation of CALFED grants for the District Agricultural and Urban Water Use efficiency programs. Developed proposals and received grant fund for two District's water recycling projects from Proposition-13 grant funding.

In partnership with the Santa Clara Farm Bureau, UC Cooperation Extension, Department of Agriculture, Department of Water Resources, and Santa Clara County Natural Resource Conservation Service, Developed and conducted nine Agricultural Irrigation and Nutrient Management seminars for the County growers and interested groups

Associate Land Water Use Analyst, California Department of Water Resources

Technical coordinator for the Assembly Bill 325 Task Force Advisory Committee in 1991 and 1992 and facilitated the development of the State Landscape Water Conservation Model Ordinance. Assisted water agencies, cities and counties to develop and implement landscape water conservation guidelines and ordinances.

As a member of the State Water Conservation Advisory Committee, participated in the development of the Best Management Practices (BMPs) in water conservation.

Participated in the negotiation with the agricultural stakeholders and U.S. Bureau of Reclamation for the State Department of Water Resources Drought Water Bank. Developed a new method using nonlinear regression model to estimate crop water requirement values for major crops in the Delta's agricultural area which was the bases for the negotiation of the irrigation water use.

Member of the 1989 and 1992 Xeriscape Conferences Steering Committee and chaired the Award Subcommittee meetings.

Education:

Ph.D., University of California, Davis, 1989. Plant, Soil and Water Science.

Master of Science, California State University, Chico, 1981. Irrigation

Bachelor of Science, University of Mazandaran, 1979. Agriculture Engineering.

Certification:

Irrigation Systems Evaluation

Landscape Irrigation Master Auditor

Professional Membership:

American Society of Civil Engineers

Irrigation Association

American Water Works Association

WaterReuse Association

Christopher P. Dundon

Water Conservation Supervisor- Contra Costa Water District

Present Position

Responsible for program design, budgeting, implementation and reporting

Current programs include: single family, multi-family, commercial and large landscape survey programs, single family, multi-family, and Commercial ULFT rebate and distribution programs, single family and commercial washer rebate programs, and public education programs

Represent CCWD on the CUWCC Steering Committee and on the CalFed WUE Public Advisory Committee

Work Experience

1999 – Present

Water Conservation Supervisor
Contra Costa Water District, Concord, California

1991 – 1999

Water Conservation Specialist
Contra Costa Water District, Concord, California

1988 – 1991

Landscape Architect, Carducci Associates, San Francisco, CA

Education and Professional Registration

B.S. Landscape Architecture, 1987, University of California at Davis

Licensed California Landscape Architect

Certified Water Auditor, Irrigation Association

Certified Conservation Practitioner, American Water Works Association

Kelly I. Warren

***Water Conservation Specialist
Contra Costa Water District***

2000 – Present

Water Conservation Specialist
Contra Costa Water District, Concord, California

1997 – 2000

Staff Assistant
City of Fresno, Water Conservation Program, Fresno, California

1995 – 1997

Senior Administrative Clerk
City of Fresno, Building & Safety Engineering Section, Fresno,
California

1991 – 1995

Administrative Clerk II
City of Fresno, Water Conservation Program, Fresno, California

Administer Water Conservation Programs. Responsibilities include the following:

- Market, plan, coordinate and implement water conservation programs
- Prepare flyers, newspaper advertisements, pamphlets and letters
- Conduct Single Family interior and exterior surveys
- Conduct Multi-Family interior surveys
- Project Manager for Ultra Low Flow Toilet Rebate program
- Project Manager for Ultra Low Flow Toilet Multi-Family distribution program
- Project Manager for High Efficiency Washing Machine Rebate Program
- Compiled and produced procedure manual for Single Family and Multi-Family Surveys
- Project Manager for the Water Conservation Access database
- Plan, prepare, setup, and maintain exhibits/booths at local community events
- Manage quality customer service for residential customers
- CUWCC Residential Committee representative

Hal McCutchan

Water Conservation Specialist Sonoma County Water Agency

Water Conservation Specialist, Sonoma County Water Agency, Santa Rosa, CA.

- Plan, organize, and direct the activities of a water resources program.
- Establish a public educational program on water quality and conservation.
- Coordinate budget and program management activities.
- Negotiate agreements with various agencies and special interests to facilitate program activities.
- Water Conservation Representative, East Bay Municipal Utility District, Oakland, CA.
- Researched and implemented new water resources technologies and equipment.
- Developed demand-side water budgets for commercial, industrial, institutional entities.
- Negotiated agreements with various agencies and special interests to facilitate program activities.
- Provided technical expertise in developing public information material related to water conservation.

Environmental Program Manager/Coordinator, Residuals Processing, Inc., Novato, CA.

- Developed successful public bids and private contracts for long-term, multimillion-dollar beneficial reuse projects.
- Prepared detailed financial and operational proposal information to meet bid and contractual specifications.
- Managed project implementation activities to completion; inclusive of supervising subcontractors, tracking financial performance, and handling customer service.
- Coordinated and assessed soil, surface water, and groundwater monitoring programs with various public agencies for compliance and reporting.

Hydrologic Unit Area (HUA) Project Coordinator, U. C. Cooperative Extensive Extension, Stanislaus County, CA.

- Developed an outreach program on reducing non-point source pollution to the San Joaquin River (Stanislaus County).
- Applied and secured funding via grants, contract donations, and interagency partnerships.
- Consulted with agricultural and landscaping businesses on water, soil fertility, and crop production.
- Analyzed and composed research results for reports and scientific publications.
- Developed and prepared informative publications, videos, and workshops for the general public.

Education:

M. B. A. in Management, Golden Gate University, San Francisco, CA. May 1998.

M. S. in Horticulture, U. C. Davis, CA. December 1990

Concentration: Plant-Soil-Water Relations

B. S. in Horticulture, California Polytechnic State University, San Luis Obispo, CA. June 1987.

Vana N. Phibbs

Water Conservation Specialist Alameda County Water District

Present

The marketing and public relations specialist related to the District's extensive conservation program. Responsible for design and development of multiple conservation programs to marketed to the public sector. Work closely with state agencies in conservation compliance. Wrote grants and was awarded over \$400,000 in grant funding of ACWD projects. Agency liaison to various state organizations related to urban water conservation.

Terranomics Retail Services, Marketing Associate

Functioned as member of a marketing/public relation's team for one of the west coast's largest retail real estate companies.

U.S. Chamber of Commerce, Public Affairs Manager for the Western United States

Worked with chamber of commerce and association executives in the western states. Wrote and produced a regional newsletter for members. Conducted volunteer leadership training and long-range strategic planning workshops for members. Represented the US Chamber at chamber of commerce and association events throughout the west. Did extensive public speaking on legislative issues affecting business.

International Association of Business Communicators, Manager of Member Services

Liaison to the association's chapter leaders (over 100 chapters in the US and abroad), wrote extensively for targeted newsletters, planned two national training meetings for chapter leaders annually and produced various publications for chapter leader's related to chapter development and support.

Hyatt Hotels, Sales Manager

National sales manager for a major hotel in the San Francisco Bay Area.

Education:

Comparative Religious Studies (B.A), California State University

Animal Science, Pre-Veterinarian, Oklahoma State University

Institute of Organization Management – Stanford University

(Completed professional certification in association management – six-year program)

Institute Organization Management – University of Colorado)

Water Conservation Practitioner – American Water Works Association certification.

Various professional development opportunities

Jacques Debra

City Of Davis

Mr. DeBra has 16 years of utility and resource management experience. He attended UCSB with a focus in resource planning and environmental management. He worked for the City of Santa Barbara helping to establish a long term water conservation program effort during the severe drought in the 1980s/early 90s. This included involvement in the original DWR landscape water auditor program, and implementation of tiered rates with a focus on reducing outdoor water use and peak water demands. Mr. DeBra was one of the initial certified water auditors in the DWR program. Since that time, he has been managing water conservation programs as a part of overall utility management responsibilities. Mr. DeBra brings demand management experience to the project team that will be helpful for the project implementation and monitoring/evaluation phases. Mr. DeBra is a long time member of AWWA, and is recent chair and vice-chair of the CA-NV section water conservation committee and past chair of the CA-NV section meter committee. He also chaired the last revision of manual M22 (meter and service line sizing) to be published early next year.

Stan Gage

President Of The Board

Los Trancos County Water District

Mr. Gage has 27 years of experience on the Board of Directors of Los Trancos County Water District. As a Board Member, he has interfaced with many consultants to the water district for the purpose of demand studies, global replacement of the entire District's above ground capital assets, implementation of numerous systems to create District systems that will minimize the impact on residents in the event of a major earthquake (the District straddles the San Andreas Fault).

He also has 35 years experience as a manager in hi-tech industries. (6 years in manufacturing management, 9 years in customer relationship management, 9 years in R&D management, 11years in business unit management consulting).

Role of External Cooperators

This program will be implemented in partnership with the water agencies listed below, as well as the California Urban Water Conservation Council. Each of the participating water agencies has been on the forefront of water conservation program implementation in the State. By partnering on this project, they bring their combined skills, experience and knowledge together in a dynamic way.

Water Agencies

Alameda County Water District

Contra Costa Water District

City of Davis

Los Trancos County Water District

Santa Clara Valley Water District

Sonoma County Water Agency

California Urban Water Conservation Council

The California Urban Water Conservation Council was formed in 1991, as a result of the signing of the Memorandum of Understanding Regarding Urban Water Conservation. Since then the Council has played a key role in promoting statewide water use efficiency. Its membership includes water agencies, environmental organizations and other interested parties. The Council is a consensus organization and represents the interests of all its members. The majority of the participating agencies are signatories to the Urban MOU, and members of the CUWCC. Developing a program of this broad scope will require many of the skills that the Council brings to the table. The Council provides a forum for information transfer and coordination of resources amongst its members. The Council anticipates providing program co-ordination between the Northern agencies and Metropolitan, as well as general support for this project.

A-9 INNOVATION

ET Controller Technology

In California, landscape water usage for single-family and small commercial customers is an opportunity that has largely gone untapped. For years water agencies have been attempting to find a service or technology that could be cost-effectively implemented and, as important, desired by customers.

Until recently, there was no viable irrigation controller product that caught the consumers' attention and yielded durable water savings. Water surveys that provided customers with customized irrigation schedules also did not result in long-term savings.

The EvapoTranspiration (ET) controllers to be offered through the proposed Project offer a technology that will stimulate customer interest and achieve long-term savings. In this program, it is intended to replace the common "clock-type" irrigation controllers with controllers possessing this new technology.

EvapoTranspiration (ET) is the combined process of water evaporating from the soil and water transpiring from plants. ETo, or reference evapotranspiration, is based on calculated values of several factors, including solar radiation, temperature, and moisture in the air and wind speed. ET can vary considerably from week to week, so to maximize water use efficiency with existing, standard controller technology, one needs to adjust irrigation schedules and re-program controllers on at least a weekly basis. This real-time ET can be downloaded from weather stations located throughout California.

The average ETo for a specific location is referred to as normal-year ETo, or historical ET. It reflects the amount of water that is both transpired and evaporated from a plot of tall fescue grass. It is used to develop an irrigation schedule. However, because it is based on a normal year, adjustments have to be made to the schedule to compensate for variations from normal-year ETo.

The amount of water that a plant needs can be calculated based upon the ET and a factor that is specific to plant types (known as the crop coefficient). An appropriate irrigation schedule for a specific site is developed from a combination of the local ET value (ETo adjusted by the crop coefficient) and other site variables, such as soil type, sun exposure, or degree of slope. The challenge is in getting residential customers and landscape site managers to make the appropriate calculations and adjust their irrigation schedules appropriately as ET changes. Traditionally landscape water management has been poor because the process of developing irrigation schedules is time-consuming and sophisticated. As a result, over-watering of landscape sites is very common, and results in several problems:

- Most plants cannot store more water than they need to meet evapotranspiration needs; water applied in excess of their needs is wasted
- Over irrigation causes excessive run-off that contributes to non-point source pollution
- Over-irrigation tends to result in poorer plant health and increased site maintenance costs

- Summer peak demands on water distribution systems are exacerbated by excessive irrigation

The existing ET controllers on the market are large, centralized systems that cost thousands of dollars. They are usually not cost-effective for smaller commercial sites, and certainly not for residential customers. However, new technology exists that incorporates ET-based irrigation scheduling into cost-effective residential and commercial controller models. They either use real-time ET transmitted by signal to the controller on a weekly basis, or they use irrigation schedules based upon adjusted historical ET. ET-based irrigation controllers remove the need for customers to make scheduling adjustments, while ensuring that the landscapes receive the appropriate amount of water. This cost-effective technology finally addresses the gap between the science of irrigation scheduling and the ability and time required of customers to implement it. Once installed, ET-based controllers automatically adjust the irrigation schedule for the site. The benefits of this breakthrough are multiple and far-reaching in scope, and include:

- Water savings
- Improved plant health
- Reduced non-point source pollution
- Reduced green waste
- Reduced “summer peaking” problems resulting from excessive irrigation

The Project will install ET irrigation controllers on residential and smaller commercial sites. Currently there are two versions of production-ready residential ET controllers that have been used in California and other western states.

One version includes a chip with 10 years of historical evapotranspiration (ET) data from 13 different regions in the country. Given several inputs, the controller associates the site location with a specific ET region and then adjusts the irrigation schedule (which initially has to be input by the end user or an installation contractor) as the average historical ET values change. The controller provides a temperature sensor option designed to modulate the average historical ET data to make it more closely reflect actual local weather conditions. This controller is self-sufficient. It requires no outside inputs after it is set up. The manufacturer of this controller is Aqua Conserve.

The second version of an ET controller is more sophisticated than the historical model. It requires responses to a series of questions about each zone of landscape controlled by each station of the controller. Those questions refer to site-specific variables such as plant type, soil type, sun/shade exposure, type of irrigation system, slope of terrain, and the zip code for the controller’s location. A more data intensive programming option for turfgrass zones requires input about plant root depth and the irrigation system’s precipitation rate. With this data the controller computes an irrigation schedule for each station. Thereafter, it collects local ET data on a weekly or more frequent basis and then remotely adjusts the schedule via a satellite paging technology as ET data changes. This kind of ET controller, commonly referred to as a “real-time” controller, requires an on-going remote signal (at a fee) to adjust the irrigation schedule as local ET changes. The manufacturer of this controller is Hydro Point.

Currently these are the primary production-ready ET controllers being used and tested. However, long-standing irrigation equipment manufacturers such as Rain Bird, Toro and

Weathermatic have also expressed desire to introduce these kinds of controllers. It is unknown what technologies they and other manufacturers will incorporate in their ET controllers. Those technologies may be different than the technologies currently available.

Large landscape sites in California have been targeted for programs by water agencies and, to a great degree are market driven. Water purchases for large sites can be a major line item cost for the customer and these economics drive the customers' motivation to participate in conservation programs. On the other hand, residential and small commercial sites are generally perceived as hard-to-reach markets, with economics that do not send a strong conservation signal to the customer.

The single-family and small commercial customers make up a large percentage of the overall water demand yet, to date, water agencies have had few services or products of interest to customers. As a result, these markets have long been under-addressed. The ET controller products and technology will allow the water agencies to offer their customers an effective way to save significant water and improve the health of their landscape.

The California water agencies are determined to be the impetus that motivates irrigation equipment industry to manufacture and market ET Controllers as a principal item in their product line. Our program model is based on the highly successful toilet market transformation process of the past ten years. Our major goal is to transform the residential and small commercial irrigation market with the same vigor and success that occurred with ultra-low-flush toilets. The plumbing industry was permanently changed as a result of the water agencies' toilet replacement program initiatives. We intend to replicate this model of success and drive the irrigation product industry in a similar direction.

Early Program Barriers	ULFT Market Issues	ET Controller Issues	Solutions used in the ULFT program and included in the ET Controller Program
Devices not widely known or accepted by customers	✓	✓	Water agencies create an offer that is hard to turn down. Initiate targeted marketing campaigns to increase customer awareness and provide education regarding product benefits
Product manufacturers have little incentive to modify their product offerings for new technology	✓	✓	Educate forward-vision manufacturers about market potential. Create market potential by placing large orders for product
Distributors experienced little or no demand for the new product	✓	✓	Help viable manufacturers to link up with distributors Create demand through program production
Early models experienced performance problems	✓	✓	Test models and select products with quality performance. Select at least two products for promotion and distribution. Maintain stringent quality assurance practices for the program to identify and resolve product problems. Provide market and technical feedback to manufacturers and distributors.
Installers did not believe that the technology could work	✓	✓	Initially work with a select group of installers. Educate wider circle of installers utilizing performance statistics and hands-on workshops.

EBMUD believes that the best way to initiate market transformation is with this proposed ET controller program. Customers will respond to the attractive program offerings and high level of customer convenience. This program is the critical first step in EBMUD's campaign to drive ET controllers into the market. It is our belief that the eventual downstream result, in years to come, will be that...

- The customer will elect to pay retail price for the ET Controller because of customer's desire for the product, i.e., no water industry incentives will be required.
- Product selection will increase and prices will decrease due to customer demand.
- Manufacturers will substantially reduce or discontinue the production of inefficient controllers in lieu of ET controllers.
- Governing bodies will enact legislation requiring ET controllers for landscape in new construction projects.

A-10 AGENCY AUTHORITY

Authority to Submit an Application and Enter Into a Funding Contract with the State

The Board of Directors of the East Bay Municipal Utility District has authorized the General Manager to submit application materials to request grant funds for qualifying District programs and facilities and to execute application materials. A certified copy of Resolution No. 33237-01 is attached in Appendix C as evidence of such authorization.

With respect to the authority to enter into a funding contract with the State, the District's authority to enter into contracts is set forth in Public Utilities Code Sections 12721 and 12802. Section 12721 generally authorizes the District to make contracts of any nature whatsoever. More specifically, Section 12802 expressly authorizes the District to enter into contracts with the State for, among other things, the financing of enterprises in which the District is authorized to engage:

"A district may accept, without limitation by any other provisions of this division requiring approval of indebtedness, contributions of money, rights of way, labor, materials, and any other property for the construction, maintenance, and operation of any enterprise in which the district is authorized to engage, and may enter into any contracts and cooperate with and accept cooperation from the State, or any department, instrumentality, or agency thereof, or any public agency of the State in the construction, maintenance, and operation of, and in financing the construction, maintenance, and operation of, any such enterprise". (emphasis added)

Statutory Authority under which the District was Formed and Authorized to Operate

The District was formed under and authorized to operate pursuant to the Municipal Utility District Act of 1921 ("Act"). (Public Utilities Code Section 11501 et seq.)

No Election Required

Section 12802 of the Act expressly authorizes the District to enter into a contract with the State for the financing of any District enterprise without regard to any other provision of the Act requiring approval of indebtedness. The District knows of no requirement that an election be conducted before entering into a funding contract with the State with respect to the proposed project.

Funding Agreement not Subject to Review by Other Government Agencies

The District knows of no requirement that other government agencies review and/or approve a funding agreement between the District and the State for the proposed project.

No Pending Litigation Impacts Financial Condition of the District or Operation of Its Facilities

The Office of General Counsel knows of no pending litigation that may impact the financial condition of the District, the operation of its water facilities, or its ability to complete the proposed project.

A-11 OPERATIONS AND MAINTENANCE

Not applicable

APPLICATION PART B- NOT APPLICABLE

This section is not applicable for this application

APPLICATION PART C

This project is not subject to CEQA or NEPA.

APPLICATION PART D – NEED FOR PROJECT AND COMMUNITY INVOLVEMENT

D-1 Need for the Project

The efficient use of California's limited water supplies is a local, regional, and statewide issue of critical importance. The Bay-Delta supplies 22 million people in the state with water. However, there is an imbalance between the available supplies and beneficial uses of the Bay-Delta system. CALFED's water management strategy is to reduce that imbalance in order to improve the overall health of the Bay-Delta, increase supply reliability, and improve water quality. Water use efficiency is one of the strategies that will help to meet this objective, as stated in CALFED's Record of Decision (ROD).

CALFED has established an aggressive water use efficiency program that encompasses urban and agricultural conservation, and urban recycling. The estimated potential for urban conservation is nearly 2 million acre-feet per year. Among the various urban uses of water, landscape irrigation is one that offers significant opportunities for savings. CALFED estimates that residential landscaping statewide is currently irrigated at about 1.2 times the ETo, which suggests that over watering is a major cause of water waste. EBMUD's proposal to install and monitor 4,085 self-adjusting irrigation controllers in the water service areas of a coalition of water agencies represents a significant step toward achieving the conservation potential sought by CALFED.

This project is intended to significantly increase urban water use efficiency through the installation of ET-based irrigation controllers. Residential water demand in California accounts for 54% of total urban water demand and is forecasted to reach 58% by the year 2020 as a result of population growth, primarily in the hotter, inland areas of the state.

The 1999 AWWA Residential End Uses of Water Study found that a significant portion of residential consumption is devoted to irrigation (58%). The study also found that homes with automatic sprinklers use 47% more water than those without automated systems. Much of the problem is due to the complexity and time involved in developing irrigation schedules. The ET-based irrigation controller technology removes that barrier by automatically adjusting the schedule based upon either real-time or historical ET.

Small commercial landscape sites also represent a significant potential for water savings. These sites tend to be not as well managed as the larger commercial sites, many of which have an expensive centralized irrigation controller. The controllers proposed in this project make ET-based scheduling a cost-effective option, even for the smaller sites.

The proposed project provides water use efficiency beyond the level of the existing BMPs. Although BMPs 1 and 5 do address landscape water use, all measures do not necessarily result in effective water savings with long-term persistence. The installation of ET-controllers will generate long-term water savings that have persistence.

The water savings from this project would reduce the need for withdrawals from the Bay-Delta, thereby contributing to statewide water management strategies and objectives. On a regional and local level, they contribute to improved water reliability

resulting from more efficient use of available resources. The program has a significant ability to support CALFED objectives for ecosystem restoration, water quality, and water supply reliability as the District's existing and future sources of supply involve diversion from the Delta. Two key CALFED program elements are directly addressed by this program. The water management program element expressly identifies conservation as one of its goals. The water use efficiency program element stresses "real water" conservation and the ability to increase instream flows for ecosystem health. Generating savings from existing customers satisfies the "real water" test, and the corresponding reduction in Delta diversion on a year-round basis preserves instream flows during critical periods.

This project is also consistent with the Integrated Resources Management Plans of the participating agencies that include demand-side management through water conservation efforts as part of the long-term water supply mix. It is also consistent with the Urban Memorandum of Understanding (MOU) and associated BMPs. The participating agencies in this project are signatories to the Urban MOU, and have committed to implementing cost-effective conservation measures.

Finally, many of the urban agencies are also facing local problems resulting from non-point source pollution and excessive run-off. Over-watering is a key source of urban run-off. Therefore, irrigation scheduling based upon ET, and the reduction of excess irrigation will also contribute to reduced levels of urban run-off and non-point source pollution.

Specific issues driving the need for this project for the individual participating agencies are discussed below.

East Bay Municipal Utility District

The project is located within the CALFED solution area. East Bay Municipal Utility District (EBMUD) obtains approximately 95 percent of its water supply from the Mokelumne River, an eastside tributary to the Bay-Delta system. By the year 2020 EBMUD could face water shortages of up to 25 percent or 69 MGD or 77,500 AFY. During dry years when storage levels cannot recover, water saved by conservation accrues to storage. It then remains available to serve EBMUD customers in the future should drought conditions continue. This benefits California water resources (Cal/Fed perspective), by decreasing the amount of competition that EBMUD must exert on alternative supplies such as the water bank. In wet years, when Mokelumne storage levels remain full, water saved through conservation passes down the Mokelumne River and becomes available for downstream benefits. These benefits include in-stream habitat, delta water quality improvements, and downstream consumptive uses that would otherwise be diverted. The increased supply will trigger additional in-stream releases in the early years of a drought, providing additional high-quality Mokelumne River releases to the Delta.

Alameda County Water District

ACWD is a retail water purveyor with a service area of approximately 100 square miles encompassing the cities of Newark, Union City and Fremont. The District receives water supplies from the State Water Project, San Francisco's Hetch-Hetchy system, and from the local Alameda Creek Watershed. The District's Integrated Resources Planning study (IRP), completed in 1996, indicated that, due to deficiencies in imported and local

supplies, the District could face dry year shortages of up to 50% in the future. In order to ensure future dry year reliability, the District's water supply strategy included desalination, reclamation, off-site groundwater banking, local conjunctive use and an aggressive water conservation program.

Since a primary use of water in the ACWD service area is for landscape irrigation, the IRP recommended that ACWD's conservation program focus on improving irrigation efficiency for residential, business, and institutional customers. Improving irrigation efficiency not only reduces the total water demand, but it also reduces the need for additional facilities to meet peak summer demands. Water saved through the conservation program can then be "banked" in the District's local groundwater basin (Niles Cone Groundwater Basin) or at the off-site groundwater banking program at Semitropic Water Storage District. This banked water can subsequently be used in dry years when ACWD's imported water supplies may face cutbacks of 80% or greater. The proposed ET Irrigation Controller Program is consistent with ACWD's planning for reducing outdoor water use, and will help meet the District's water savings goals as part of ACWD's long-term water supply strategy.

City of Davis

The City of Davis is pursuing area-of-origin water rights on the Sacramento River through its water rights application on file with the State Water Resources Control Board. The application provides for up to 20,000 AFY of surface water should the city receive a permit from the SWRCB and perfect the rights for beneficial uses out to 2042. To this end, conservation efforts that accomplish peak demand water savings, like the proposed ET Controller project, would reduce the amount of summer water needed from the Sacramento River to meet the city's future demands. The city is located in the area of origin of the Bay-Delta, and would need less surface water during normal and drought years should demand hardening be accomplished for peak demands that ultimately stress California's surface water supplies the most. Reducing future surface water needs through conservation would have a beneficial impact on fisheries and other biota in the Bay-Delta watershed.

Contra Costa Water District

The San Francisco Bay Area as a region has experienced a large level of growth in recent decades. Contra Costa County leads the nine-county region in rankings for population and housing increases projected over the period 1995 to 2020. The primary reason for this ranking is due to the ongoing development occurring in the East County area from Pittsburg east to the County Line. Population projections based on ABAG projections developed as part of the District's FWSS are provided in Table 3-1.

Table 3-1 Population Trends					
Service Area	2000^(a)	2005	2010^(b)	2015	2020^(c)
Treated Water Service Area (Clayton, Clyde, Concord, Martinez, Pacheco, Pleasant Hill, Port Costa, Walnut Creek, and unincorporated)	212,050	218,400	224,750	230,145	235,540
Raw Water Service Area (Antioch, Bay Point, Martinez, Oakley, Pittsburg, and unincorporated)	215,740	242,555	269,370	283,660	297,950
Other Areas ^(d) (Bethel Island, Brentwood, Hotchkiss Tract, Knightsen, Veale Tract, and unincorporated)	1,970	7,485	13,000	16,420	19,840
Total	429,760	468,440	507,120	530,225	553,330

(a) CCWD FWSS, 1996. Service Area A.

(b) CCWD FWSS, 1996. Service Area B.

(c) CCWD FWSS, 1996. Service Area C.

(d) Areas within CCWD's service area or planning areas of its customers.

(e) ABAG's Projections 2000 indicate population in the TWSA has not changed significantly since 1996.

CCWD has obtained its water supply from the Delta since 1940. Delta water is subject to large variations in salinity and mineral concentrations. CCWD is almost entirely dependent on the Delta for its water supply. CCWD's primary source is the United States Bureau of Reclamation's (USBR) Central Valley Project (CVP). CVP water consists of unregulated flows and regulated flows from storage releases from Shasta, Folsom, and Clair Engle reservoirs into the Sacramento River. Other sources include the San Joaquin River and Mallard Slough.

Groundwater resources in the CCWD Service Area do not supply significant amounts of water to meet or augment raw water demands. Of the three discernable groundwater sources - Ygnacio, Clayton and the Pittsburg/Antioch Areas - only the Clayton area produces appreciable amounts of groundwater. There are an undetermined number of wells throughout the CCWD service area owned by industries, private individuals, and public municipal water utilities. CCWD does not manage groundwater, and does not have figures as to how much water is pumped from these wells, but estimates total use within CCWD boundaries at approximately 3,000 af/yr. Existing CCWD wells in the vicinity of the Bollman Water Treatment Plant (Mallard Well Fields) can provide approximately 1,000 af/yr but are limited by the threat of contamination from adjacent industrial areas and physical factors such as air entrapment.

Transfer Water / Purchases

CCWD has signed an agreement with ECCID (effective January 1, 2000) and a joint agreement with ECCID and Department of Water Resources (DWR) (April 11, 1991, and amended February 7, 2000) to purchase surplus irrigation water to be used for M&I purposes in ECCID's service area. Only a portion of ECCID is within the existing CCWD service area (estimated current demand of 3,500 af/yr). The current ECCID agreement allows CCWD to purchase up to 8,200 AF/YR for service in the overlap area with ECCID and 4,000 af/yr of groundwater (by exchanges) when the CVP is in a shortage situation.

CCWD has also entered into a short-term water purchase agreement with Western Water Company. CCWD will purchase approximately 3,400 acre-feet of water in calendar year 2000 and has the option to purchase up to 8,000 acre-feet in 2001 in the event water conditions next year are severely dry. A long-term agreement is being negotiated.

Other Supplies in the District Service Area

The City of Antioch and four industrial users hold water rights from the San Joaquin River. The City of Antioch has rights to water from the San Joaquin River and can currently divert water at a rate up to 25 cfs. Actual diversions from the river are limited due to the poor water quality that often exists in the San Joaquin River. Antioch therefore relies on raw water deliveries from CCWD to meet remaining customer demand.

Gaylord Container and Ultramar Diamond Shamrock (formerly Tosco Corporation) have rights to divert up to 28,000 af/yr and 16,650 af/yr, respectively. Other industries that hold rights to water from the San Joaquin River are Dupont and USS-Posco. These supplies, like the Mallard Slough supply, are variable because of poor water quality that often exists in the San Joaquin River.

Ecosystem restoration and Water Quality: Because CCWD draws water directly out of the Delta, reduced diversions due to the project will improve the delta ecosystem and water quality. In addition, the project will improve irrigation practices by reducing the amount of runoff from landscapes. Because this runoff may include fertilizer, herbicides and pesticides, a reduction in runoff will result in improved water quality.

Los Trancos County Water District

The water usage within the Los Trancos County Water District is already at or above the District's assured level of supply from the Hetch Hetchy System. The Los Trancos County Water District supply assurance level from the Hetch Hetchy System is about 54,200 units of water per year. For the past 3 years, the District has averaged ~56,500 units of water per year in total purchases. The District is working to reduce demand through improving water use efficiency and inclining rate structures rather than resorting to allocations or rationing. The Los Trancos County Water District has commissioned a study of water usage within the District and is targeting the upper 25% of landscape water users for water use efficiency improvement. The study shows that these customers consume approximately 50% of the landscape water demand within the District or a total of approximately 3500 units (about 8 acre feet) of landscape water demand per month during the 7 months of mid-April through mid-November. The

expected annual water savings of 23 acre-feet from installing ET Controllers will be significant in helping the District reach its goals.

Santa Clara Valley Water District

By 2020, Santa Clara County could experience a water supply shortage of 100,000 acre feet (af) during critical dry years, based on current supplies and projected growth.³ According to forecasts made by the California Department of Water Resources (DWR), the county is expected to face the largest drought year shortages in the San Francisco Bay Region.⁴ In 1994, SCVWD identified water supply reliability as its top priority issue.⁵

The SCVWD Board adopted in 1996 an Integrated Water Resource Plan (IWRP) designed to develop flexible long-term water supply plans that meet the future water needs in the county. SCVWD is currently in the process of updating this plan. The IWRP identifies several core elements intended to close the gap between projected demands and existing sources of supply. One of these core elements is water conservation. SCVWD has set a demand reduction target of 57,100 AF/year by 2020. Specific demand reduction targets were developed for five water use sectors: residential interior, residential exterior, commercial/industrial interior, commercial/industrial exterior, and agricultural. These targets are shown in Table 1.

The proposed ET Irrigation Controller Program is designed to substantially contribute to meeting the residential exterior and the commercial/industrial exterior targets shown in Table 1.

The IWRP also addresses water quality and watershed protection concerns in the region. In this regard, SCVWD has worked with regional environmental organizations and public interest groups to develop the Santa Clara Basin Regional Watershed Management Initiative (WMI). A specific goal of the WMI is to reduce pollution of watershed creeks from urban runoff, including reductions in pesticides, herbicides, and other toxic substances associated with drainage for urban irrigation.⁶ It is well documented that the overuse of water to maintain urban landscapes results in direct and indirect types of nonpoint-source pollution (NPS). Direct NPS pollution problems associated with water overuse for landscape maintenance include increased nutrient and soil runoff from the landscaped area, as well as other pollutants from urban and developed lands. Indirect NPS pollution problems include increasing overall demand for additional development and use of water supply reservoirs.⁷

Numerous studies demonstrate the leaching potential of nitrogen from turf. Researchers at Cornell University found that 60% of nitrogen applied to turf leached to ground water.⁸

³ Santa Clara Valley Water District, "Integrated Water Resources Plan: Implementation Plan," June 1999.

⁴ California Department of Water Resources, "The California Water Plan Update," Vol. 2, Bulletin 160-98. 1998.

⁵ Santa Clara Valley Water District, "Integrated Water Resources Plan: Implementation Plan," June 1999.

⁶ Santa Clara Valley Water District, "Clean, Safe Creeks & Natural Flood Protection," July 2000.

⁷ Environmental Protection Agency, "Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters," EPA-840-B-93-001c January 1993.

⁸ Long Island Regional Planning Board. 1984. Nonpoint Source Management Handbook. Hauppauge, New York.

Shultz (1989) suggests that 50% of the nitrogen applications are leached out and not used by plants.⁹ A study completed by Exner and others (1991) showed that as much as 95% of nitrate applied in late August on an urban lawn was leached below the turf grass root zone.¹⁰

NPS pollution from excessive landscape irrigation in Santa Clara County either leaches into regional groundwater basins or discharges into the San Francisco Bay. By decreasing the amount of water used for landscape maintenance production, the proposed ET Irrigation Controller Program will reduce the entry of these pollutants into regional surface and ground waters. More efficient irrigation practices also reduce the likelihood of pesticide contamination of local ground and surface water supplies.

Sonoma County Water Agency

The Sonoma County Water Agency (Agency) is the primary provider of potable water for approximately 570,000 people in Sonoma County and Marin County. The Agency holds water rights permits to divert Russian River and Dry Creek flows and re-divert water stored and released from Lake Mendocino and Lake Sonoma. The Agency re-diverts water from the Russian River through five Ranney collector wells located near the community of Forestville. This water is delivered wholesale to Agency customers through its water transmission system. The responsibility for supplying this water is entrusted to the Agency through an agreement entitled "Agreement for Water Supply and Construction of the Russian River-Cotati Intertie Project" which was executed in 1974 and most recently amended in 2000. The 1974 Agreement for Water Supply was entered into with the cities of Cotati, Petaluma, Rohnert Park, Santa Rosa, and Sonoma, and the Forestville, North Marin, and Valley of the Moon Water Districts (collectively known as the water contractors). The facilities authorized by the 1974 Agreement for Water Supply were expected to serve peak month deliveries at 92 million gallons per day (mgd) of the month of maximum use, plus 20 mgd of standby capacity.

Table 1. Water Use Reductions Anticipated by 2020 by Sector in af/year

Sector	2000	2005	2010	2015	2020
Residential Interior	12,900	19,200	22,500	22,300	22,300
Residential Exterior	5,800	9,700	12,000	13,400	19,900
Commercial/Indust. Interior	2,100	2,500	2,700	2,700	7,500
Commercial/Indust. Exterior	4,700	7,300	7,500	6,700	6,400
Agricultural	700	1,000	1,000	1,000	1,000
Total (af/year)	26,200	39,700	45,700	46,100	57,100

In August 1996 and again in June 1997, the Agency's total water in transmission system storage declined to about a 12-hour supply. These two events raised concerns about the adequacy and reliability of the Agency's existing facilities to provide the monthly

⁹ Schultz, W. 1989. *The Chemical-Free Lawn*. Rodale Press, Emmaus, PA.

¹⁰ Exner, M.E., M.E. Burbach, D.G. Watts, R.C. Shearman, and R.F. Spalding. 1991. Deep Nitrate Movement in the Unsaturated Zone of a Simulated Urban Lawn. *Journal of Environmental Quality*, 20:658-662.

average rate of 92 mgd, which the Agency is currently obligated to deliver, and emphasized the need for additional facilities to reliably meet existing and future demands.

The Agency's Board of Directors declared a temporary impairment of the reliable water production capacity of the Agency's water transmission system for the defined period of June through September through the year 2005 (temporary impairment). During the temporary impairment, the Agency may not be able to reliably deliver some of the water supply entitlements to the Agency's water contractors when water demands are at their highest until transmission upgrades are finalized.

In the past decade, the Sonoma County Water Agency and its prime contractors have been active in situating the California Department of Water Resource's California Irrigation Water Management System (CIMIS) stations throughout their watersheds. Business and residential customers have been introduced to the evapotranspiration concept and have access to the information through the newspaper, intra-agency voice recordings, and the internet. However, the information has not been easily implemented and utilized due to the complexity of planning a site-specific irrigation schedule and incorporating the information into an existing and sometimes intimidating controller.

The main objective of the ET Controller Grant proposal will be to achieve a long-term reduction in landscape water usage during peak periods through the installation and use of ET-based controllers. This irrigation efficiency technology will mitigate the Agency's transmission supply system during peak water demands, which coincide with the irrigation season (June 1-September 30).

As the population of the County continues to grow, conservation is one of the most cost-effective approaches to offset this demand. This grant proposal will offer the combination of installed technologies and customer education. It will 1) encourage responsible, cost-effective water use, which can be integrated into common, necessary consumer activities; 2) support maximum resource efficiency standards by increasing the market share of ET-based residential controllers; and 3) promote consumer confidence in higher efficiency equipment.

Three of the Agency's prime contractors applying under this grant proposal including the City of Sonoma, North Marin Water District, and the City of Petaluma, have stormwater drainage that flows into San Pablo Bay.

APPLICATION PART E – WATER USE EFFICIENCY IMPROVEMENTS AND OTHER BENEFITS

E-1 Water Use Efficiency Improvements

The water savings from installing ET controllers will help to improve urban supply reliability and/or environmental water supply reliability. This project is expected to reduce withdrawals from the system of approximately 45,995 acre feet. Even at a lower implementation level of 2,065 controllers, the project is expected to generate water savings of 30,477 acre feet.

Sensitivity Testing

We conducted the analysis using the data from the Irvine Study (expected level of water savings), however, also tested a 20% lower level of savings and at a 10% higher level of savings to account for variations in service areas, lot sizes, irrigation practices, and differences in ETo. At the optimal level of implementation with the expected level of savings, the benefit/cost ratio is 6.88. At the lower level of implementation with the expected level of savings, the benefit/cost ratio is 6.55. Even at the lower levels of savings (20% lower) the benefit/cost ratios are 5.84 for the optimal level of implementation and 5.64 for the low level of implementation. See Appendix A and B.

Beneficial Uses

That water can be used for a variety of other beneficial uses depending on the participating agency, including:

In EBMUD's service area, water saved by conservation accrues to storage during dry years, and is available to serve EBMUD's customers during years of shortage. The 1,102 acre feet per year estimated savings represents approximately 0.4% of EBMUD's annual water use of about 220 MGD (245,000 AF). This alleviates pressure from EBMUD on other alternative sources of supply, such as the water bank, during drought years. In wet years, the water is released through the Mokelumne River (an eastside tributary to the Delta) and is available for downstream benefits.

Improved water supply reliability for Los Trancos County Water District. Los Trancos has exceeded its assured level of supply from Hetch Hetchy by about 2300 units of water per year. The Los Trancos County Water District has commissioned a study of water usage within the District and is targeting the upper 25% of landscape water users for water use efficiency improvement. The study shows that these customers consume approximately 50% of the landscape water demand within the District or a total of approximately 3500 units (about 8 acre feet) of landscape water demand per month during the 7 months of mid-April through mid-November. The expected annual water savings of 23 acre-feet from installing ET Controllers will be significant in helping the District reach its goals of improving water supply reliability for the District.

Alameda County Water District's Integrated Resources Planning study (IRP), completed in 1996, indicated that, due to deficiencies in imported and local supplies, the District could face dry year shortages of up to 50% in the future. Improving irrigation efficiency not only reduces the total water demand, but it also reduces the need for additional facilities to meet peak summer demands. Water saved through this conservation

program can then be “banked” in the District’s local groundwater basin (Niles Cone Groundwater Basin) or at the off-site groundwater banking program at Semitropic Water Storage District. This banked water can subsequently be used in dry years when ACWD’s imported water supplies may face cutbacks of 80% or greater.

In 1994 and in 1997 Sonoma County Water Agency’s total water in its transmission system dropped to 12 hours of supply. This occurred during peak transmission times which coincides with the irrigation season. This temporary impairment is expected to occur from June – September through 2005. Any reduction in irrigation usage during times of temporary impairment will improve water supply reliability for the County. This project is expected to reduce irrigation demand during peak transmission times by 160 AF annually.

Santa Clara County could experience a water supply shortage of 100,000 acre feet (af) during critical dry years, based on current supplies and projected growth. According to forecasts made by the California Department of Water Resources (DWR), the county is expected to face the largest drought year shortages in the San Francisco Bay Region. In 1994, SCVWD identified water supply reliability as its top priority issue. In order to improve the water supply reliability for Santa Clara County, The District developed targets for landscape water use reduction of 10,300 AF/yr by 2000, increasing to 17,200 AF/yr by 2010. The expected annual water savings of 2726 AF from this project will help the District to meet that goal, and improve long-term water supply reliability.

Contra Costa Water District draws water directly out of the Delta, therefore reduced diversions due to the project will improve the delta ecosystem and water quality. In addition, the project will improve irrigation practices by reducing the amount of runoff from landscapes. Because this runoff may include fertilizer, herbicides and pesticides, a reduction in runoff will result in improved water quality.

The City of Davis is pursuing area-of-origin water rights on the Sacramento River through its water rights application on file with the State Water Resources Control Board. The application provides for up to 20,000 afy of surface water should the city receive a permit from the SWRCB and perfect the rights for beneficial uses out to 2042. To this end, conservation efforts that accomplish peak demand water savings, like the proposed ET Controller project, would reduce the amount of summer water needed from the Sacramento River to meet the city's future demands. We estimate the annual water savings and associated reduced demand from this project at 45 AF. The city is located in the area of origin of the Bay-Delta, and would need less surface water during normal and drought years should demand hardening be accomplished for peak demands that ultimately stress California's surface water supplies the most.

E-2 Other Project Benefits

The proposed project will also achieve water quality improvements. Landscapes that are over-irrigated often result in run off. Irrigation run off carries urban pollutants into the bay. Self-adjusting controllers will significantly reduce runoff and pollutants from reaching the bay ecosystem. Through the reduction of run-off, water quality is enhanced, pollutants from pesticides and fertilizers remain on-site, and pollutants will have the opportunity to degrade on-site before being conveyed into natural waterways.

A Residential Runoff Reduction Study (R3) Study has been conducted to evaluate run-off reduction and changes in pollution concentration in run-off as a result of installing ET

Controllers. The formal R-3 study period was completed June 30, 2002, with the final results anticipated in December 2002. A review of the pre-retrofit and post-retrofit flow data in the neighborhood of the R-3 Study was conducted. The graph in Appendix E demonstrates preliminary results. From the flow data, a conservative run-off reduction of 15.25 gallons per minute (from 19.46 to 4.51 gallons per minute) is estimated. Benefits of run-off have not been quantified in this analysis since the final study results are not complete. Statistically valid data for run-off reduction and water quality benefits should be available at the end of 2002.

Other non-quantifiable benefits of the proposed Project include:

Reduced green waste in landfills

Excessive irrigation promotes excessive plant growth, which then must be cut and hauled to landfills, which are becoming scarcer as they are progressively filled. Municipalities have been mandated by state ordinances to reduce green waste or face penalties. More accurate and conserving irrigation will reduce plant growth and reduce the green waste dumped in landfills. Also, lowering the amount of green waste will lower gases generated by the green waste biomass and enhance air quality.

Market Transformation

A key benefit expected to arise from the proposed Project is providing significant impetus to the transformation of the types of controllers used for landscape irrigation. Major irrigation equipment manufacturers are taking notice of the growing water agency demand for “smart” controllers. Providing a significant statewide ET controller installation program in the state in which most major landscape irrigation equipment manufacturers are headquartered will provide a clear signal that this type of controller is essential for the future of landscape water conservation.

Help meet standards set by AB 325

Since its adoption in 1993, the State Model Water Efficient Landscape Ordinance has fallen short of its goal to require new landscape projects meet 80% of reference evapotranspiration. Self-adjusting controllers will help customers manage both new and existing landscapes closer to this target. Most customers adjust irrigation run times only once or twice a season. Even conscientious water managers seldom adjust controllers more than once a month. Most self-adjusting technology available today will adjust daily or hourly, resulting in significant water savings. Through market transformation, this Project will help achieve the goals of AB325.

Reduction of Peak Demand and Drought Management Control

ET controllers that receive an external signal to adjust irrigation schedules also provide an opportunity to reduce peak demand during the hot summer months by scheduling controllers to irrigate during early hours of the morning when little water use is occurring. The remote signaling feature could also be used by retail water agencies to conserve water during periods of severe drought by remotely reducing customers' irrigation schedule run times. The latter use of these controllers would obviously have to be exercised with due caution. Also, controllers that use other types of technology to automatically change irrigation schedules according to changes in ET will reduce peak demand by not over-watering during the hot summer months.

Jobs and Training

This project is anticipated to create jobs throughout the state. They include:

- ET-Controller assembly and production workers
- ET-Controller installation crews
- Administration
- Data entry positions
- Out-sourced program implementation will require project coordinators, administrators etc.

APPLICATION PART F- ECONOMIC JUSTIFICATION: BENEFITS TO COSTS

F1 Net Water Savings

All of the coastal agencies participating in the proposed Project drain directly into the San Francisco Bay, and therefore any water losses from excess irrigation are either going to an unusable destination or being lost through evaporation or transpiration. In the City of Davis, which relies on local groundwater, ET controller water savings directly reduces the impact on the aquifer in the city service area. Furthermore, curtailments in outdoor water use reduce the seasonal demands during the summer months when demand is highest. Should the City rely on a treated surface water for a portion of future water demands, this would reduce the impact on the Bay-Delta system.

Optimal program implementation levels would result in the installation of 4,085 ET-based irrigation controllers, with a 10-year product life-span, and would be expected to generate water savings of 45,995 acre feet. Even at a lower implementation level of 2,065 controllers, the Project is expected to generate water savings of 30,477 acre-feet.

Sensitivity Testing

We conducted the cost-benefit analysis using the data from the Irvine Study (expected level of water savings), however, we also tested a 20% lower level of savings and a 10% higher level of savings to account for variations in service areas, lot sizes, irrigation practices, and differences in ETo. At the expected level of savings for the optimal level of implementation, the benefit/cost ratio is 6.88. At a 20% lower level of savings, the benefit/cost ratio for the optimal level of implementation is still 5.84 (see Appendix A).

Pilot Studies

The Irvine Ranch Water District study has been the most comprehensive pilot study of ET controllers to date. The Irvine Study documented water savings of 57gpd for an average irrigated landscape of 2,000 square feet. We believe that the other studies cited in Part A-6 support the findings of the Irvine study.

Landscape Area and Controller Coverage

The Irvine Study calculated savings on an average square foot lot size of 2,000 square feet. However, irrigation controllers can control significantly larger areas. It is likely that many of the sites in the Irvine study did not utilize all of the stations or zones available on the controller. The table below represents broad ranges for coverage, based on an assessment of meter sizes, flow rates, and sprinkler head type. However, individual sites may vary considerably, depending on the existing landscape, irrigation system design, and meter size. It is also assumed that not all stations on a controller would be used. This is the usual practice to allow for future renovations to the landscape. Residential grade 12-station controllers can function well in some small commercial applications. We estimate that approximately 20% of small commercial sites can be managed by a residential controller.

Type of Controller	# of Stations	# Stations Used	Gallons Per Station	Spray Heads Coverage Range Sq. Ft	Rotors Coverage Range Sq. Ft
				Area Per Station 600 – 1000 sq.ft	Area Per Station 10,000 – 25,000
Residential Grade	12	10	12-18 gpm	Up to 12,000	Up to 30,000
Commercial	12 to 24	20	30-50 gpm	40,000 – 60,000	60,000 – 100,000
Commercial	24 to 48	40	30-50 gpm	80,000 – 120,000	120,000 – 200,000

Estimated water savings are calculated based on the average square footage of the targeted sites for each of the individual agencies' service areas, extrapolating the data from the Irvine Study. Each agency developed the average square footage for their targeted sites based on data from landscape surveys, other landscape programs, and data from baseline studies conducted in their service areas. Lot sizes in the Davis area are significantly larger than those found in much of the Bay Area, with the exception of the very large residential lot sizes found in Los Trancos.

Normal Year ETo

We reviewed the normal year ETo for the participating agencies and compared the normal year ETo with that of Irvine. The average normal year ETo for Irvine is 49.63 and for the participating agencies is 49.15. However, the ETo for the months during the typical irrigation season of March to October is higher for the participating Northern agencies than for Irvine. The more inland service areas – Davis, Contra Costa, and parts of EBMUD's service area have higher ETos than that of Irvine, while some of the more coastal areas are slightly lower. However, on average the ETo for the Northern agencies is fairly similar to that of Irvine and it could be argued that one could expect similar levels of water savings with ET controllers as were obtained in the Irvine study.

F-2 Project Budget and Budget Justification

A detailed line-item budget for each of the implementation methods is shown in Appendix A, Unit Implementation Costs. Line-item budgets for the start-up costs and ongoing central administration of the program are also found in Appendix A.

In summary, the 3-year budget for the elements of the program is as follows:

Start-up Costs (Year 1):

Certain start-up costs will be incurred during the first year to establish relationships with the equipment manufacturers and develop technical specifications covering the minimum requirements for the products to be used in the program. Anticipated costs are as follows:

Start Up Costs	Cost
Development of product specifications and coordination of procurement practices and pricing options with manufacturers and vendors	\$20,000
Development of standard marketing templates for each of the six implementation methods	\$10,000
Database development; reporting and recordkeeping forms development	\$100,000
Total estimated start-up costs	\$130,000
Amortized cost per ET Controller unit**	\$31.82

*** - Total start-up costs of \$130,000 amortized over all 4,085 (optimal level) controllers planned.*

Note: The cost per ET Controller unit for the low level of implementation is \$49.90, based on amortizing the total cost over 2,605 units.

Program Evaluation - Monitoring and Assessment

Ongoing monitoring and assessment during the period of Project implementation is forecasted to cost \$350,000 for both companion programs (Metropolitan and East Bay MUD), one-half of which (\$175,000) has been allocated equally to each of the two programs.

Monitoring and Assessment Tasks	Cost
Process Evaluation	\$45,000
Impact Evaluation	\$130,000
Total Monitoring and Assessment*	\$175,000
Per Unit Monitoring and Assessment**	\$ 42.84

Central Program Administration:

Because of the geography of the Project and the large number of water agencies participating, it will be cost-effective to perform certain common functions through a central administrative office. Costs of those centralized functions are estimated as follows:

Central Administration Tasks	Cost
Central Program Coordinator (3 yrs @ \$60,000)	\$180,000
Customer Service Administration	\$7,500
Industry Liaison	\$50,000
Central Administrative Overhead (20%)	\$47,500
Total Central Program Administration*	\$285,000
Per Unit Administration**	\$ 69.77

Central administration costs of \$285,000 amortized over all 4,085 (optimal level) controllers planned. The cost per ET Controller unit for the low level of implementation is \$109.40.

Program Implementation and Operation

Costs of program implementation and operation are detailed by fiscal quarter within Appendix A and summarized as follows:

Cost Category	Cost
Materials/Installation	\$134,375
Equipment Purchases	\$2,162,436
Other (includes program marketing, user training, user workshops, field inspections of installed controllers)	\$1,172,043
Total Program Implementation and Operation*	\$3,471,267
Per Unit Program Implementation and Operation	\$849.75

**Cost includes pro-rata share of start-up costs and central program administration costs shown above and covers the installation of 4085 controllers over the three-year program period.*

Cost-Sharing

EBMUD and the other participating agencies have committed the following per controller unit as a program cost share.

	Self-Install	Direct Install
Residential controllers	\$115	\$145
Commercial up to 24-station controller	\$100	\$300
Commercial 24- to 48-station controller	\$200	\$400

In addition, customers receiving a controller under one of the direct install or small commercial implementation methods will be required to provide a co-payment as a condition for receiving a controller. Those co-payments are scheduled as follows:

	Self-Install	Direct Install
Small commercial up to 24 stations	\$200	\$200
Small commercial 24-48 stations	\$300	\$300

Customers will also pay signal fees for years 2-10, as applicable.

Therefore, program implementation costs will be partially offset through participant funding as follows:

Cost/Funding Category	Costs & Co-Funding
Total program implementation and operation	\$3,471,267
Less: Participating hard dollar water agency	\$478,262
Less: Customer funding (through co-payments)	\$432,700
Less: Water agency In-kind services	\$275,067
Remainder - Grant Application	\$2,285,238

F-3 ECONOMIC EFFICIENCY

Expected benefits

The program of irrigation controller replacement will yield benefits to public and private entities over the expected 10-year useful life of the hardware. A quantification of the water savings benefits has been included in Appendix A for the optimal level of implementation. Appendix B contains the analysis for the lower level of implementation. The estimated water savings is 45,995 AF over the 10-year life of the equipment. The present value of those benefits is calculated at \$3,244,342. The present value of the costs is \$471,306. The benefit/cost ratio is 6.88. At the lower level of program implementation, the present value of the costs is \$2,148,975 and the present value of the costs is \$328,309. The benefit/cost ratio for the lower level of implementation is 6.55.

The project is locally cost effective for all of the participating agencies on an individual basis at both levels of implementation. Even with 20% lower water savings than expected, the project remains locally cost-effective for all agencies. See Appendix A and B, Tab 10-Cost and Savings Value.

The avoided costs from implementing this project are derived from avoided water purchases, reduced treatment costs, energy savings and delay of development of alternative sources of supply. The actual avoided costs vary by participating agency, and therefore will be discussed as such:

East Bay Municipal Utility District

EBMUD is currently implementing a long-term integrated water resources plan to meet project water shortages and future demand in the year 2020. EBMUD water supply reliability goals are to be achieved through a combination of demand management strategies, including conservation and recycling, and supplemental supply. Avoided costs of implementing the proposed ET Controller Project derive from avoided conveyance, treatment, and distribution costs, chemical and energy costs from EBMUD's current Mokelumne River and local reservoir supplies. Also included are the reduced capital and operating costs in the sizing and operation of new supplemental supply facilities (i.e., Freeport Regional Water Authority Project).

Other benefits include additional power generation revenues from increased in-stream flows resulting from conservation. Avoided costs were calculated based on the full project life water savings.

Current supply is based on FY02 actual costs for energy, chemicals, and disposal (\$14M) for pumping, distribution, and treatment divided by water sales of 190 MGD.

Alternative Capital Cost of Supply is based on the impact of our entire conservation program (17MGD) on the design capacity of the Freeport Regional Water Authority Project, and scaled to the water savings of the proposed ET controller Project. At the margin, the individual impact of the ET controller project on the design capacity of the Freeport Project may be minimal, but EBMUD's conservation program is made of many different conservation projects that collectively have a significant impact on the design of the Freeport Project. Therefore, it is generally appropriate to analyze the impact of

the 17 MGD Conservation program on the Freeport Project and then apportion the impact to the individual conservation projects.

The 17 MGD Conservation program has reduced the design capacity of the Freeport Project from 117 MGD to 100 MGD. The capital cost was reduced from \$475M down to the current estimate of \$439M (estimate based on capital costs are proportional to the square root of the ratio of flow capacity, $\text{Cost A/Cost B} = (\text{Capacity A/Capacity B})^{0.5}$). Dividing \$36 M by 17 MGD yields a capital cost reduction of \$1,895 per acre-foot of conservation. Amortized over 30 years at 6% yields \$138 per acre-foot annually.

Avoided Freeport O&M numbers are the result of reducing the amount of water taken from the Freeport project and thus eliminating the treatment, transmission, and water purchase costs. Treatment and transmission costs are \$148 per acre-foot, and the current USBR contract cost of service rate is \$58 per acre-foot. Since the Freeport project will be in operation only on average once every three years, these O&M numbers are divided by three to get average annual avoided O&M costs.

Additional power sales: the conservation project will allow for more power generation. Based on \$20 per Mwh, 0.39 Mwh/acre-foot, a 90 to 95% utilization and \$300K O&M costs, yields \$7 per acre-foot.

Alameda County Water District

ACWD's next source of supply is a brackish groundwater desalination facility. The first phase of the facility (5 mgd) will be on-line in 2003. A second phase is scheduled to on-line in 2009.

This facility will utilize the reverse osmosis process to remove salts and other impurities from brackish groundwater and the treated water will be utilized as a potable supply. Implementation of conservation programs will reduce the needed size and operation of future expansions of this facility.

The figures below were supplied to the Conservation Department by ACWD's Engineering Department.

Desalination Facility Annualized Costs per Acre-Foot (Full Year Operation)

Project Phase	Capital	O&M	Total
Phase I with Intertie Pipeline (5MGD Desal, 4MGD P-T)	\$350	+ \$250	= \$600

A much more complicated question is ACWD's estimate of the avoided cost of wastewater. A separate company, Union Sanitary District, manages ACWD's service area wastewater treatment. Based on the cost of treating water, which was supplied by Shannon Szychowski in the Commercial Services Team at USD, the following information is being used to figure the avoided cost of wastewater.

The cost of treating weak strength wastewater is \$1.81 per 1,000 gallons per year.

$$\begin{array}{rcl} \$1.81 & \times & 326,000 \\ 1,000 \text{ gallons} & & \text{AF} \end{array}$$

In following the equation above the cost of treating 1 AF of water is \$ 590.06. If that cost is avoided then \$ 590.06 per AF is saved annually.

Contra Costa Water District

The value of the project benefits is calculated based on the total avoided costs resulting from the volume of water saved over the controller life. The water saved in any given year is associated with the last increment of supply to be utilized (usually the most costly source). In CCWD's case, the sole source of supply is the Central Valley Project (CVP) water over the first 5 years of project operation, and a mixture of CVP water and transfer water for the second 5 years of the project. The project conservatively assumes 10-year controller life. Using a volume-weighted approach, 40 percent of the net water savings will occur in the first 5 years due to the 3-year phasing of toilet installation. The remaining 60 percent of the net water savings occurs during the period when the more costly transfer water is available. Thus, the avoided costs are calculated in this proportion between current supply source (CVP) and future supply source (transfer).

Therefore the average weighted avoided cost based on the tables below is \$344 per acre-foot.

4a. Avoided Costs of Current Supply Sources (40% of net water savings)

Variable Cost Components	Variable TWSA Costs (\$/AF)	Annual Avoided TWSA Costs (\$)
(a)	(b)	(d)
Central Valley Project Supply	\$60	
Raw Water Pumping, O&M	\$31	
Treatment O&M	\$130	
Treated Water Pumping, O&M	\$69	
TOTAL	\$290	

4b. Alternative Costs of Future Supply Sources (60% of net water savings)

Variable Cost Components	Variable TWSA Costs (\$/AF)	Annual Avoided TWSA Costs (\$)
(a)	(b)	(d)
Transfer Supply	\$150	
Raw Water Pumping, O&M	\$31	
Treatment O&M	\$130	
Treated Water Pumping, O&M	\$69	
TOTAL	\$380	

City of Davis

The avoided cost of water for the City of Davis is \$394/AF. This is calculated as follows:

Annual O & M	\$4,800,000
Annual Capital	\$1,250,000
Total Annual Costs	\$6,050,000
Annual Production	15,342 AFY
Cost per AF = \$6,050,000/15342 =	\$394/AF

Los Trancos County Water District

The cost of water delivered in the District includes the wholesale cost of the water from Hetch Hetchy, wheeling charges paid to move the water from the Hetch Hetchy System to the Los Trancos County Water District System, pumping costs within the District and distribution losses.

Water costs for FY' 2001/2002 are established as follows:

{(SFWD Wholesale Water Rate) + {Wheeling costs per unit} + {Estimated Electrical Power Cost/kWh x 4kwh per unit delivered}}/(Ratio of Water Sold/Water Purchased)= Water Rate / unit sold

SFWD rate	=	\$0.88/unit
Electrical Power Costs	=	4 x 0.188*
Water sold/Water Purchased	=	0.9
Wheeling costs	=	\$0.17 per unit

Therefore,

$$(\$0.88 + \$0.17 + 4 \times \$0.188) / 0.9 = \$2.00 / 100 \text{ cu ft} = \$871.20 \text{ per acre ft.}$$

**Based on mean estimated cost of power forecast by ABAG May 1 memo rationalizing suspension of ABAG Power Purchase Pool. Memo values estimated PG&E power to cost 14.8 – 22.8 cents per kWh. Mean value is 18.8 cents.*

Santa Clara Valley Water District

The Santa Clara Valley Water District's Integrated Water Resources Plan (IWRP) forecasts supply and demand for the District through 2020. The IWRP includes a baseline that incorporates the water use efficiency measures that the District is already doing. It also includes an investment strategy for future supplies of water. The investment strategy will be a combination of ag conservation, M&I conservation (including ET controllers), banking and transfers and various other options to be included in the future. The investment strategy will be recommended to begin immediately in order to offset projected shortages. If the District does not implement the strategy, which includes ET controllers, it will need to implement the next viable options, which are desalinization and recycling projects. The avoided cost for the recycling projects is even higher than the \$941 projected for desalinization. Even with the strategy, including ET controllers, being implemented, the IWRP projects that the District will have to implement desalinization and recycling projects in 2010. Therefore, this ET controller project will help to defer the need for the desalinization and recycling projects.

Sonoma County Water Agency

The reduction of water usage would be in the peak period of the Agency's transmission. Sonoma County Water Agency is a wholesaler. The avoided costs are from the perspective of the retailers that contract water from the Agency, since they will be the implementers of this project. On average, the charge per acre foot for water used for municipal purposes by water contractors is \$397.90. (Russian River Wholesale).

BENEFIT COST ANALYSIS TABLES

Appendix 1 & 2

APPENDIX 1

High Scalable level of implementation

Table 1: Capital Costs

	Capital Cost Category	Cost	Contingency Percent	Contingency \$	Subtotal
	(a)	(b)	(c)	(d) (bxc)	(e) (b+d)
(a)	Land Purchase/Easement	0	0.00%	0	0
(b)	Planning/Design/Engineering	0	0.00%	0	0
(c)	Materials/Installation	134,375	0.00%	0	134,375
(d)	Structures	0	0.00%	0	0
(e)	Equipment Purchases/Rentals	2,162,436	0.00%	0	2,162,436
(f)	Environmental Mitigation/Enhancement	0	0.00%	0	0
(g)	Construction/Administration/Overhead	0	0.00%	0	0
(h)	Project Legal/License Fees	0	0.00%	0	0
(i)	Other	1,172,043	0.00%	0	1,172,043
(j)	Total (1) (a + ... + i)				3,468,854
(k)	Capital Recovery Factor: Use Table 6				0.1359
(l)	Annual Capital Costs (j x k)				471,306

(1) Costs must match Project Budget prepared in Section F-2.

Table 2: Annual Operations and Maintenance Costs

Administration (a)	Operations (b)	Maintenance (c)	Other (d)	Total (e)
0	0	0		0

Table 3: Total Annual Costs

Annual Capital Costs ⁽¹⁾	Annual O&M Costs ⁽²⁾	Total Annual Costs
(a)	(b)	(c) (a+b)
\$471,306	\$0	\$471,306

(1) From Table 1, line (l)

(2) From Table 2, column (e)

**Table 4: Water Supply Benefits
(2002 Dollars)**

Net water savings (acre-feet / year) 4,599.50

**4a. Avoided Costs of Current Supply
Sources**

Sources of Supply	Cost of Water (\$/AF)	Annual Displaced Water Supply (AF)	Annual Avoided Costs (\$)
(a)	(b)	(c)	(d) (b x c)
East Bay Municipal UD	\$280.00	1102	\$308,560
Contra Costa WD	\$344.00	221	\$76,024
Sonoma	\$397.90	160	\$63,664
Davis	\$394.00	45	\$17,730
Los Trancos	\$871.20	23	\$20,038
Alameda CWD	\$600.00	322	\$193,200
Santa Clara Valley WD	\$941.00	2726	\$2,565,166
			\$0
Total		4599	\$3,244,382

4b. Alternative Costs of Future Supply Sources

Future Supply Sources	Total Capital Costs (\$)	Capital Recovery Factor ⁽¹⁾	Annual Capital Costs (\$)	Annual O&M Costs (\$)	Total Annual Costs (\$)
(a)	(b)	(c)	(d) (bxc)	(e)	(f) (d+e)
Santa Clara Valley WD			0		
			0		0
			0		0
			0		0
			0		0
Total					0

(1) Use number from Capital Recovery Factor Table 6

4c. Water Supplier Revenue (Vendability)

(a) Parties Purchasing Project Supplies	(b) Amount of Water to be Sold (AF)	(c) Selling Price (\$/AF)	(d) Expected Frequency of Sales (⁽¹⁾) (%)	(e) Expected Selling Price (\$/AF)	(f) "Option" Fee (⁽²⁾) (\$/AF)	(g) Total Selling Price (\$/AF) (e+f)	(h) Annual Expected Water Sale Revenue (\$) (b x g)
				0		0	0
				0		0	0
				0		0	0
				0		0	0
				0		0	0
Total							0

During the analysis period, what percentage of years are water sales expected to occur?

For example, if water will only be sold half of the years, enter 50% (0.5).

(2) "Option" fees are paid by a contracting agency to a selling agency to maintain the right of the contracting agency to buy water whenever needed. Although the water may not be purchased every year, the fee is usually paid every year.

Table 4d. Total Water Supply Benefits

(a) Annual Avoided Costs of Current Supply Sources from 4a, column (d)	\$3,244,382
(b) Annual Avoided Costs of Alternative Future Supply Sources from 4b, column (f)	\$0
(c) Annual Expected Water Sale Revenue from 4c, column (h)	\$0
(d) Total Net Annual Water Supply Benefit (\$) (a+b+c)	\$3,244,382

Table 5: Benefit/Cost Ratio

Project Benefits (\$) ⁽¹⁾	\$3,244,382
Project Costs (\$) ⁽²⁾	\$471,306
Benefit/Cost Ratio	6.88

(1) From Table 4d, row (d): Total Annual Water Supply Benefits

(2) From Table 3. column (c): Total Annual Costs

Table 6: Capital Recovery Table

Life of Project (in years)	Capital Recovery Factor
7	0.1791
8	0.1610
9	0.1470
10	0.1359
11	0.1268
12	0.1193
13	0.1130
14	0.1076
15	0.1030
16	0.0990
17	0.0954
18	0.0924
19	0.0896
20	0.0872
21	0.0850
22	0.0830
23	0.0813
24	0.0797
25	0.0782
26	0.0769
27	0.0757
28	0.0746
29	0.0736
30	0.0726
31	0.0718
32	0.0710
33	0.0703
34	0.0696
35	0.0690
36	0.0684
37	0.0679
38	0.0674
39	0.0669

40	0.0665
41	0.0661
42	0.0657
43	0.0653
44	0.0650
45	0.0647
46	0.0644
47	0.0641
48	0.0639
49	0.0637
50	0.0634

APPENDIX 2

Low Scalable level of implementation

Table 1: Capital Costs

	Capital Cost Category (a)	Cost (b)	Contingency Percent (c)	Contingency \$ (d) (bxc)	Subtotal (e) (b+d)
(a)	Land Purchase/Easement	\$0	0.00%	\$0	\$0
(b)	Planning/Design/Engineering	\$0	0.00%	\$0	\$0
(c)	Materials/Installation	\$85,500	0.00%	\$0	\$85,500
(d)	Structures	\$0	0.00%	\$0	\$0
(e)	Equipment Purchases/Rentals	\$1,369,813	0.00%	\$0	\$1,369,813
(f)	Environmental Mitigation/Enhancement	\$0	0.00%	\$0	\$0
(g)	Construction/Administration /Overhead	\$0	0.00%	\$0	\$0
(h)	Project Legal/License Fees	\$0	0.00%	\$0	\$0
(i)	Other	\$961,067	0.00%	\$0	\$961,067
(j)	Total (1) (a + ... + i)				\$2,416,380
(k)	Capital Recovery Factor: Use Table 6				0.13587
(l)	Annual Capital Costs (j x k)				\$328,309

(1) Costs must match Project Budget prepared in Section F-2.

Table 2: Annual Operations and Maintenance Costs

Administratio n (a)	Operations (b)	Maintenanc e (c)	Other (d)	Total (e)
0	0	0		0

Table 3: Total Annual Costs

Annual Capital Costs (1) (a)	Annual O&M Costs (2) (b)	Total Annual Costs (c) (a+b)
\$328,309	\$0	\$328,309

(1) From Table 1, line (l)

(2) From Table 2, column (e)

4a. Avoided Costs of Current Supply Sources

Sources of Supply	Cost of Water (\$/AF)	Annual Displaced Water Supply (AF)	Annual Avoided Costs (\$)
(a)	(b)	(c)	(d) (b x c)
East Bay Municipal UD	\$280.00	680	\$190,400
Contra Costa WD	\$344.00	141	\$48,504
Sonoma	\$397.90	100	\$39,790
Davis	\$394.00	35	\$13,790
Los Trancos	\$871.20	18	\$15,682
Alameda CWD	\$600.00	325	\$195,000
Santa Clara Valley WD	\$941.00	1749	\$1,645,809
			\$0
Total		3048	\$2,148,975

4b. Alternative Costs of Future Supply Sources

Future Supply Sources	Total Capital Costs (\$)	Capital Recovery Factor ⁽¹⁾	Annual Capital Costs (\$)	Annual O&M Costs (\$)	Total Annual Costs (\$)
(a)	(b)	(c)	(d) (bxc)	(e)	(f) (d+e)
Santa Clara Valley WD			0		
			0		0
			0		0
			0		0
			0		0
Total					0

(1) Use number from Capital Recovery Factor Table 6

4c. Water Supplier Revenue (Vendability)

(a) Parties Purchasing Project Supplies	(b) Amount of Water to be Sold (AF)	(c) Selling Price (\$/AF)	(d) Expected Frequency of Sales ⁽¹⁾ (%)	(e) Expected Selling Price (\$/AF)	"Option" Fee ⁽²⁾ (\$/AF)	(g) Total Selling Price (\$/AF) (e+f)	(h) Annual Expected Water Sale Revenue (\$) (b x g)
				0		0	0
				0		0	0
				0		0	0
				0		0	0
				0		0	0
Total							0

(1) During the analysis period, what percentage of years are water sales expected to occur? For example, if water will only be sold half of the years, enter 50% (0.5).

(2) "Option" fees are paid by a contracting agency to a selling agency to maintain the right of the contracting agency to buy water whenever needed. Although the water may not be purchased every year, the fee is usually paid every year.

Table 4d. Total Water Supply Benefits

(a) Annual Avoided Costs of Current Supply Sources from 4a, column (d)	\$2,148,975
(b) Annual Avoided Costs of Alternative Future Supply Sources from 4b, column (f)	\$0
(c) Annual Expected Water Sale Revenue from 4c, column (h)	\$0
(d) Total Net Annual Water Supply Benefit (\$ (a+b+c)	\$2,148,975

Table 5: Benefit/Cost Ratio

Project Benefits (\$) ⁽¹⁾	\$2,148,975
Project Costs (\$) ⁽²⁾	\$328,309
Benefit/Cost Ratio	6.55

(1) From Table 4d, row (d): Total Annual Water Supply Benefits

(2) From Table 3. column (c): Total Annual Costs

Table 6: Capital Recovery Table	
Life of Project (in years)	Capital Recovery Factor
7	0.1791
8	0.1610
9	0.1470
10	0.1359
11	0.1268
12	0.1193
13	0.1130
14	0.1076
15	0.1030
16	0.0990
17	0.0954
18	0.0924
19	0.0896
20	0.0872
21	0.0850
22	0.0830
23	0.0813
24	0.0797
25	0.0782
26	0.0769
27	0.0757
28	0.0746
29	0.0736
30	0.0726
31	0.0718
32	0.0710
33	0.0703
34	0.0696
35	0.0690
36	0.0684
37	0.0679
38	0.0674
39	0.0669

40	0.0665
41	0.0661
42	0.0657
43	0.0653
44	0.0650
45	0.0647
46	0.0644
47	0.0641
48	0.0639
49	0.0637
50	0.0634

APPENDIX A

Documentation for High Scalable Level of Implementation

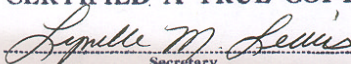
APPENDIX B

Documentation for Low Scalable Level of Implementation

APPENDIX C

Certified Copy of Resolution No. 33237-01

CERTIFIED A TRUE COPY


Secretary
East Bay Municipal Utility District

RESOLUTION NO. 33237-01

AUTHORIZING EXECUTION OF APPLICATION TO THE CALIFORNIA DEPARTMENT OF WATER RESOURCES (DWR) FOR WATER CONSERVATION AND GROUNDWATER RESOURCE CONSTRUCTION GRANTS AND LOANS

Introduced by Director McIntosh ; Seconded by Director Linney

WHEREAS, the Agricultural and Urban Water Conservation Programs (Chapter 8, Articles 3 and 6) under the Safe Drinking Water, Clean Water, Watershed Protection and Flood Protection Act (Proposition 13) authorizes DWR to issue grants and loans to public agencies to finance feasible, cost effective water conservation projects or programs to improve water use efficiency and to provide grants for feasibility studies associated with such projects; and

WHEREAS, the Groundwater Storage Program (Chapter 9, Article 2) under the Safe Drinking Water, Clean Water, Watershed Protection and Flood Protection Act (Proposition 13) authorizes DWR to issue grants to local agencies for feasibility studies, pilot projects, and the construction of projects that enhance conjunctive management of surface water and groundwater; and

WHEREAS, the East Bay Municipal Utility District (EBMUD) Board of Directors has adopted a Water Supply Management Program Action Plan that advocates the continued development of conservation programs and groundwater resources in the EBMUD service area; and

WHEREAS, EBMUD is eligible to apply for Proposition 13 loans and grants through DWR for facilities and programs that EBMUD would otherwise have to finance through other sources; and

WHEREAS, applications for Proposition 13 loans and grant funding do not constitute a commitment on the part of EBMUD to accept an award of said loans and grants nor to implement any project.

NOW, THEREFORE, BE IT RESOLVED that the Board does hereby authorize the General Manager to submit from time to time such application materials as may be required to request Proposition 13 loans and grant funds from DWR and to attach to said application as required a certified copy of this Resolution as such evidence of such authorization.

BE IT FURTHER RESOLVED that if the District is offered such a grant, the Board does hereby authorize the General Manager to accept the grant and execute any agreements and other documents,

in a form approved by the General Counsel, necessary for distribution and administration of the grant funds.

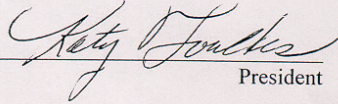
ADOPTED this 13th day of February, 2001 by the following vote:

AYES: Directors Coleman, Linney, McIntosh, Mellon, Patterson, Richardson, and President Foulkes.

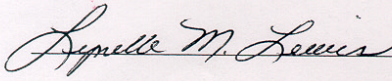
NOES: None.

ABSENT: None.

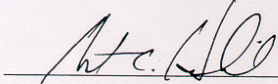
ABSTAIN: None.


President

ATTEST:


Secretary

APPROVED AS TO FORM AND PROCEDURE:


General Counsel

W:\RESOS\Grant Reso.doc

APPENDIX D

EBMUD ET Smart Controller Pilot Study Description

APPENDIX E

Residential Runoff Reduction Study Flow Data

APPENDIX F

Letters of Support

Nov 27 02 11:08a

P



Silicon Valley Toxics Coalition

760 North First St. San Jose, CA 95112 408-287-6707 svtc@svtc.org www.svtc.org



November 27, 2002

California Department of Water Resources
Office of Water Use Efficiency
P.O. Box 942836
Sacramento, CA 94236-9674

RE: Proposition 13 Urban Grant Proposal for ET Controller Program

To Whom It May Concern:

The Santa Clara Valley Water District's Water Use Efficiency Unit is in the process of applying, as part of a state-wide regional effort, for an Urban Water Conservation Grant (Prop 13 Urban Grant) to fund an ET Controller Program for Santa Clara County. Our organization is sending this letter to express our full support for this proposed program.

The goal of the Urban Water Conservation Program is to issue grants to public agencies and incorporated mutual water companies to finance feasible, cost effective water conservation capital outlay projects or programs to improve water use efficiency. The ET Controller Program grant proposal that the District is applying for is designed to help achieve this goal and will help our service area by reducing the amount of water being used in residential and commercial landscape.

We encourage the California Department of Water Resources to consider funding for this grant proposal.

Thank you.

A handwritten signature in black ink, reading "Michael Stanley-Jones".

Michael Stanley-Jones
Manager, Sustainable Water Program

Nov 27 02 11:08a
NOV-26-2002 17:07

SFPUC PLANNING

415 934 5750 P.04/05

P. 3



SAN FRANCISCO PUBLIC UTILITIES COMMISSION



November 26, 2002

Willie L. Brown, Jr.
Mayor

Ann Moller Coen
President

E. Danna Normandy
Ashok Kumar Bhatt
Jeffrey Chen
Robert J. Costello

Patricia E. Martel
General Manager

California Department of Water Resources
Office of Water Use Efficiency
P.O. Box 942836
Sacramento, CA 94236-9674

Dear Proposal Review Committee Members:

RE: Proposition 13 Urban Grant Proposal for an ET Controller Program

The Santa Clara Valley Water District's Water Use Efficiency Unit is applying for an Urban Water Conservation Grant (Prop 13 Urban Grant) to fund an ET Controller Program for Santa Clara County. The San Francisco Public Utilities Commission is sending this letter to express our full support of this proposed program.

The goal of the Urban Water Conservation Program is to issue grants to public agencies and incorporated mutual water companies to finance feasible, cost effective water conservation capital outlay projects or programs to improve water use efficiency. The ET Controller Program grant that the District is applying for is designed to help achieve this goal and will help our service area by reducing the amount of water being used for residential and commercial landscapes.

The San Francisco Public Utilities Commission would like to encourage the California Department of Water Resources to consider funding this grant proposal. If you have any questions, or would like additional information, please contact Ms. Cheryl Muñoz, Senior Water Resources Specialist, at (415) 934-5711.

Sincerely,

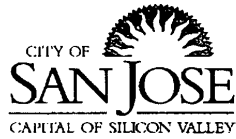
Michael Carlin
Planning Bureau Manager
San Francisco Public Utilities Commission

PLANNING BUREAU

1145 Market Street - Suite 401 - San Francisco, CA 94103- Tel. (415) 934-5700 - Fax (415) 934-5750

Nov 27 02 11:08a

p. 4



Environmental Services Department
BUSINESS SERVICES DIVISION

November 25, 2002

California Department of Water Resources
Office of Water Use Efficiency
P.O. Box 942836
Sacramento, CA 94236-9674

RE: Proposition 13 Urban Grant Proposal for ET Controller Program

To Whom It May Concern:

The Santa Clara Valley Water District's Water Use Efficiency Unit is in the process of applying, as part of a state-wide regional effort, for an Urban Water Conservation Grant (Prop 13 Urban Grant) to fund an ET Controller Program for Santa Clara County. Our agency is sending this letter to express our full support for this proposed program.

The goal of the Urban Water Conservation Program is to issue grants to public agencies and incorporated mutual water companies to finance feasible, cost effective water conservation capital outlay projects or programs to improve water use efficiency. The ET Controller Program grant proposal that the District is applying for is designed to help achieve this goal and will help our service area by reducing the amount of water being used in residential and commercial landscape.

We encourage the California Department of Water Resources to consider funding for this grant proposal.

Thank you,

Linden Skjeie
Water Efficiency Program Manager
City of San Jose



Nov 27 02 11:08a

p. 5



November 27, 2002

California Department of Water Resources
Office of Water Use Efficiency
P.O. Box 942836
Sacramento, CA 94236-9674

RE: Proposition 13 Urban Grant Proposal for ET Controller Program

To Whom It May Concern:

The Santa Clara Valley Water District's Water Use Efficiency Unit is in the process of applying, as part of a state-wide regional effort, for an Urban Water Conservation Grant (Prop 13 Urban Grant) to fund an ET Controller Program for Santa Clara County. Our agency is sending this letter to express our full support for this proposed program.

The goal of the Urban Water Conservation Program is to issue grants to public agencies and incorporated mutual water companies to finance feasible, cost effective water conservation capital outlay projects or programs to improve water use efficiency. The ET Controller Program grant proposal that the District is applying for is designed to help achieve this goal and will help our service area by reducing the amount of water being used in residential and commercial landscape.

We encourage the California Department of Water Resources to consider funding for this grant proposal.

Respectfully,

Lisa K. Kemmer
Water Conservation Coordinator
City of Sunnyvale/Dept. Public Works

ADDRESS ALL MAIL TO: P.O. BOX 3707 SUNNYVALE, CALIFORNIA 94088-3707
For deaf access, call TDD/TTY (408) 730-7501

Nov 27 02 11:09a

p. 6



CALIFORNIA WATER SERVICE COMPANY
1720 NORTH FIRST STREET • SAN JOSE, CA 95112-4598 • (408) 367-8200

November 27, 2002

California Department of Water Resources
Office of Water Use Efficiency
P.O. Box 942836
Sacramento, CA 94236-9674

RE: Proposition 13 Urban Grant Proposal for ET Controller Program

To Whom It May Concern:

The Santa Clara Valley Water District's Water Use Efficiency Unit is in the process of applying, as part of a state-wide regional effort, for an Urban Water Conservation Grant (Prop 13 Urban Grant) to fund an ET Controller Program for Santa Clara County. California Water Service Company is a retail water customer of the Santa Clara Valley Water District and is sending this letter to express our full support for this proposed program.

The goal of the Urban Water Conservation Program is to issue grants to public agencies and incorporated mutual water companies to finance feasible, cost effective water conservation capital outlay projects or programs to improve water use efficiency. The ET Controller Program grant proposal that the District is applying for is designed to help achieve this goal and will help our service area by reducing the amount of water being used in residential and commercial landscape.

We encourage the California Department of Water Resources to consider funding for this grant proposal.

Thank you.

A handwritten signature in dark ink, appearing to read "Paul Ekstrom".

Paul Ekstrom
Vice President, Customer Service and
Corporate Secretary
1720 North First Street
San Jose, CA 95112
Telephone: (408) 367-8348
Facsimile: (408) 367-8430

DISTRICT OFFICES: ANTELOPE VALLEY • BAKERSFIELD • BEAR GULCH • CHICO • DIXON • DOMINGUEZ • EAST LOS ANGELES • HERMOSA REDONDO • KERN RIVER VALLEY • KING CITY • LIVERMORE • LOS ALTOS SUBURBAN • MARYSVILLE • MID PENINSULA • OROVILLE • PALOS VERDES • REDWOOD VALLEY • SALINAS • SELMA • SOUTH SAN FRANCISCO • STOCKTON • VISALIA • WESTLAKE • WILLOWS

Nov 27 02 11:09a

P. 7



PUBLIC WORKS DEPARTMENT
100 EDES COURT
MORGAN HILL, CA 95037-5301
ENGINEERING: 408-776-7337
MAINTENANCE: 408-776-7333
FAX: 408-779-6282
WWW.MORGAN-HILL.CA.GOV

November 27, 2002

California Department of Water Resources
Office of Water Use Efficiency
P.O. Box 942836
Sacramento, CA 94236-9674

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We encourage the California Department of Water Resources to consider funding for this grant proposal.

Thank you.

Sincerely,

Mori Struve
Deputy Director Public Works Operations

Nov 27 02 11:10a

p. 8

City of Palo Alto
Utilities Department

November 27, 2002

Divisions

Administration

Director's Office
650.329.2277
650.321.0651 fax

Public Relations
650.329.2656
650.326.1507 fax

Customer Support Services

650.329.2148
650.617.3142 fax

Credit and Collection

650.329.2333
650.617.3142 fax

Utility Marketing Service

650.329.2241
650.617.3140 fax

Engineering

Electric
650.566.4500
650.566.4536 fax

Water-Gas-Wastewater

650.566.4501
650.566.4536

Telecommunications

650.329.2275
650.326.1507 fax

Resource Management

Supply Resources
650.329.2689
650.326.1507 fax

Competitive Assessment

650.329.2595
650.617.3140 fax

Operations

Electric
650.496.6934
650.493.8427 fax

Water-Gas-Wastewater

650.496.6982
650.496.6924 fax

California Department of Water Resources
Office of Water Use Efficiency
P.O. Box 942836
Sacramento, CA 94236-9674

RE: Proposition 13 Urban Grant Proposal for ET Controller Program

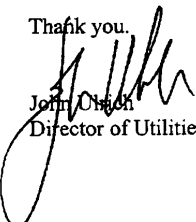
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We encourage the California Department of Water Resources to consider funding for this grant proposal.

Thank you.


John Olson
Director of Utilities

P.O. Box 10250
Palo Alto, CA 94303

Nov 27 02 01:35p

11/27/2002 11:54 6509036297

PUBLIC SVCS

P. 2
PAGE 05



November 27, 2002

California Department of Water Resources
Office of Water Use Efficiency
P.O. Box 942836
Sacramento, CA 94236-9674

RE: Proposition 13 Urban Grant Proposal for ET Controller Program

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We encourage the California Department of Water Resources to consider funding for this grant proposal.

Thank you.

A handwritten signature in black ink that reads "Steve Haren". The signature is written in a cursive, slightly slanted style.

Steve Haren
City of Mountain View

Recycled Paper